

# Supplemental foliar nutrients effects on fruit quality and yield of two new blackberry cultivars

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## **Prime-Ark® Freedom**



 World's first primocane thornless cultivar. Released 2013.

- Erect, thornless.
- Zone Range 6 8.
- Fruits– Very Lg. (9 g), good flavor.
- Harvest Late May and in fall.
- Good for local market shipping.
- Early bearing floricane fruits.
- Chill Hours Not confirmed.

Photo courtesy University of Arkansas

## **Prime Ark® Traveler**



Photo courtesy University of Arkansas Agriculture Research and Extension

- The second erect thornlessprimocane fruiting blackberry.
- Zone Range 5-9.
- Bloom Color White.
- Fruit Size Med-Large.
- Harvest Two harvests.
- Yield 1 yr. Sensitive to high heat.
- Yield 2 yr. canes, Very Good.
- Chill Hours Not confirmed.
- Good handling and storage for commercial production.

## **On-farm Study Research Data 2014**

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Cultivar	Charlotte Court House	Mechanicsville	Virginia Beach	Williamsburg
Apache-STD	*	9	*	*
Apache-RCA	*	9.8	*	*
Arapaho	*	*	*	10.5
Chester	8.5	8.3	9.7	
Chickasaw	*	8.7	*	*
Kiowa	*	8.7	*	*
Natchez	*	8.5	*	10.8
Navaho	12	*	*	10.3
Ouachita	12.8	9	*	10.3
Triple Crown (Y)	*	9	8.9	9.4
Triple Crown (O)	*	*	10.7	*

Table 1. Average °Brix reading for the 2014 growing season

## **Pre-plant Soil Amendment**

## From recommended soil sample results

Apply 185 lbs. N/Acre

Apply 3.25 tons Lime/acre



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Beds of dimensions 2.5 ft. wide by 100 ft. long



5 mil, T-55 white, woven polyethylene tarp (Reef Industries, Inc., Texas). 10' wide furrows

5' center plant spacing, 2 gph drip at planting hole



Pressure compensating drip emitters





T-trellis, guide wires for support

### **T-Trellis with Wood Post Inventory (2016)**

20 bags of Quickcrete for 9 posts	\$6.00 ea.	\$120.00
10 - 4' x 4' x 10' end posts	9.97 ea.	\$ 99.70
33 - support 4' x 4' x 10' posts between treatments	9.97 ea.	\$329.01
12 - 2' x 4' x 6' (3' for top of post and 2' for bottom of post)	4.87 ea.	\$ 58.44
66 Hex head - lag bolts	2.80 ea.	\$184.80
96 washers ( 25 per bag)	7.31 bg.	\$ 29.24
48 nuts	.20 ea.	\$ 9.60
2 - 12.5 gauge Bekaert Gaucho high tensile guide wire	109.97 ea.	\$219.94
112 - Dare Wire vise for 12.5 gauge wire (Southern States)	3.99 ea.	<u>\$223.44</u>
	Total	\$1,274.17

3' 4" Top T - Drill 3' either side cross arms2' 4" Lower T - Drill 1' either side cross arms

Cost is for 0.16 acres, for 1 acre = \$7964 on per acre basis.







- ✤ Increased yield data for primocane blackberries in Virginia?
- ✤ Foliar applications used to increase °Brix levels for a sweeter berry?
- ✤ May increase firmness and reduce the need for insecticides, helping food distribution?
- \* The potential of foliar applications increasing sugar and yield for other specialty crops?







(i) two recently released primocane, thornless cultivars 'Prime-Ark® Freedom' and 'Prime-Ark® Traveler' under coastal Virginia climatic conditions.

(ii) The effect of three nutrient foliar formulations (4-10-40 N-P-K; 0-0-25; and 4-3-3) on yield, berry sugar content, and firmness.

Product Name	Ratio	Recommended rates	
Sugar Express Sea plant extracts Ascophyllum nodosum (Kelp)	4-10-40	20 ml. in 1.5 gallons of water Sea plant extracts (24.5 lbs. for \$49.00)	
AgGrand Natural Kelp and sulfate of potash	4-3-3 Now Disconti nued	88 ml. in 1.5 gallons of water (2.5 gallon for \$100.40).	Samtani © 201
K-Ace Potassium acetate fertilizer (K) delivering increased sugar and carbohydrate production.	0-0-25	194 ml. in 1.5 gallons of water(2.5 gallon for \$50.00)	

## Pruning and Tipping

- Floricanes that grow from previous year, bear fruit in the summer
- Remove only dead or diseased canes to the ground
- Leave 4 6 healthy canes with branched tips
- New primocanes bear fruit in the early fall through the first frost – extends harvest
- ✤ Allow canes to reach 3'
- ✤ Tip prune 6 12 inches -more laterals = more berries



3 year canes pruned in February when dormant

# Harvest Results



**U.S. No. 1** berries are considered firm, developed but not overripe, and dark black in color. They are free from disease, decay, or damage by insects or other mechanical means.

**U.S. No. 2** berries are berries that fail to meet the requirements of U.S. No. 1 berries. They do not contain >10%, by volume, of berries, that are seriously damaged by any cause and not more than 2% of berries that are affected by mold and decay.

**Nonmarket berries** cannot be used for processing or local or shipping markets (U.S. Department of Agriculture [USDA], 1997).

Data table 1: Effect of the year on PrimeArk® Freedom yield in Virginia Beach, VA.

Year	U.S. No. 1	U.S. No. 2	Nonmarket	Total yield
		lb./plar	nt	
2017	0.4 b*	0.4 b	0.5 b	1.3 b
2018	1.5 a	3.0 a	0.9 a	5.4 a
Pr>F	<.0001	<.0001	<.0001	<0.001

<sup>\*</sup>Means with the same letter within a column are not significantly different using least significance difference at  $P \le 0.05$ . To get lb. per acre multiply by 700. Data table 2: Effect of the year on PrimeArk® Traveler yield in Virginia Beach, VA.

Year	U.S. No. 1	U.S. No. 2	Nonmarket	Total yield
		lb./plant		
2017	1.0 b*	0.8 b	0.5 b	2.3 b
2018	3.6 a	4.0 a	0.6 a	8.2 a
Pr>F	<.0001	<.0001	<.0401	<0.001

\*Means with the same letter within a column are not significantly different using least significance difference at P ≤ 0.05

To get lb. per acre, multiply by 700.

#### Data table 3. Fruit quality parameters of the two PrimeArk® varieties.

Cultivar	TSS (°Brix)	Firmness (kg)	Fruit size (mm <sup>2</sup> )	
Freedom	8.8-10.0	0.08 (2018 data)	787.1	
Traveler	9.5-10.1	0.12	581.3	
Ouachita	11.2	0.12	605.9	
Navaho	10.8	0.12	568.7	
Sweetie Pie	12.1	0.13	537.0	
Von	9.4	0.12	609.8	
			Samtani @	), 2019

Data table 4. 2018 total fruit yield by cane type and season.

Double crop system	Variety	Total yield (lb/plant)	Harvest date (m/dd)
Floricane bearing	Traveler	5.5	6.01 to 7.16
Primocane bearing	Traveler	2.8	7.18 to 10.11
Floricane bearing	Freedom	3.4	6.01 to 7.13
Primocane bearing	Freedom	2.0	7.16 to 10.11

To get lb. per acre, multiply by 700.

Data table 5. Comparing season yield of these varieties to other varieties at the AREC (2018 data).

Variety	U.S. No. 1	U.S. No. 2	Non market	Total yield		
		Ib/plant				
Prime Ark ®Traveler	4.3	4.5	0.8	9.6		
Prime Ark® Freedom	1.2	2.6	0.7	4.4		
Navaho	5.3	5.6	0.9	11.8		
Ouachita	3.9	5.9	0.8	10.6		
Sweetie Pie	0.8	2.6	0.5	4.0		
Von	4.7	3.6	0.6	8.9		

To get lb. per acre, multiply by 700.

## Challenges

High rainfall



## **Berry Pests**



Raccoon print evidence



Foxes enjoy berries



Green June bug *Cotinis nitida* 



Japanese beetle *Popillia japonica* 









**Raspberry Cane Borer Damage** 

### **Pest Management Options**

Pest/Problem	Management Options	Amt. of Form. per Acre	Effectiveness or Importance	REI	PHI
Raspberry cane borer - Dormant – prior to bud break	Bifenthrin IRAC – 3 (Brigade 2EC and Sniper 2EC)	6.4 fl. Oz. (soil drench)	VG	12 hrs.	3 days
	(Brigade 10WSB)	8-16 oz. (foliar) 16 oz. (soil drenc	VG h)	12 hrs.	3 days
Japanese beetle Cover spray	Malathion IRAC – 1B (Malathion 57EC)	1.5 - 3 pt.	G	12 hrs.	1 day
	(Malathion 8F)	2 pt.	G	12 hrs.	1 day

#### **Conclusions:**

Supplementary foliar nutrient treatments did not influence crop yield or fruit quality parameters over untreated control.

PrimeArk® Traveler yields were higher than Freedom in both growing seasons.

Yield in 2018 for both cultivars was significantly higher than in the 2017 growing season due to more established crop plant stand, improved pruning strategies, and greater diligence with pest control measures.

Growers should base fertilizer applications on soil and plant tissue nutrient lab. analysis and their recommendations. Acknowledgments.

Dr. Gina Fernandez, NCSU Dr. Chuck Johnson, VT Dr. Guido Schnabel, Clemson Univ. Jillian Rajevich Danyang Liu John Christman III Iman Omer Luis Santos Zachary Landis Ethan Murdock

Ashley Sibley

#### Funding.

VDACS, USDA Specialty Crop Block Grant. USDA-NIFA College of Agriculture and Life Sciences, Virginia Tech.



Thank you - Any questions?