

## Southern Maryland Small Fruit Cultivar Trials

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### Blackberry Cultivar Trials:

Blackberries are an attractive alternative crop for many fruit and vegetable farmers in Maryland, and present an opportunity to add diversity to u-pick, direct sale, or wholesale operations. In general, blackberries are well adapted to growing conditions in Maryland, but newer cultivar releases from University breeding programs in Arkansas and North Carolina have yet to be thoroughly tested in this state. In collaboration with the Southern Maryland Agricultural Development Commission, we established a cultivar trial, testing six newer cultivars at the Central Maryland Research and Education Center in Upper Marlboro, MD. The blackberry cultivars included in the trial are Arapaho, Freedom, Natchez, Osage, Ouachita, and Von (Fig. 1). All cultivars are thornless, floricanes-fruiting types, with the exception of Freedom, which is a thornless, primocane-fruiting cultivar. Floricane cultivars produce fruit on the second-year growth of the plant, which results in earlier fruit production and typically a short fruiting period with high yields (Fig. 2). These cultivars require overwintering of the first-year growth, and can be sensitive to extreme winter temperatures. Primocane cultivars develop fruit on the first-year growth, and therefore typically do not mature until late summer or early fall, which can extend the harvest season. Primocane cultivars do not rely on winter hardiness of first-year canes, and therefore may be more resilient to abnormally cold winters. For this trial, we retained the first-year growth of Freedom plants to measure both floricanes and primocane production in a single season. However, future reports will focus on primocane production in this cultivar.

The cultivar trial was initially established in the spring of 2018, with four replicates of each cultivar planted in a randomized complete block design. Each replicate contained three plants of that specific cultivar, each spaced 3 feet apart. For the initial two years, data were collected on plant vigor and survival, with 2020 being the first year that yield data were collected. Fertilizers and protective fungicides were applied according to production

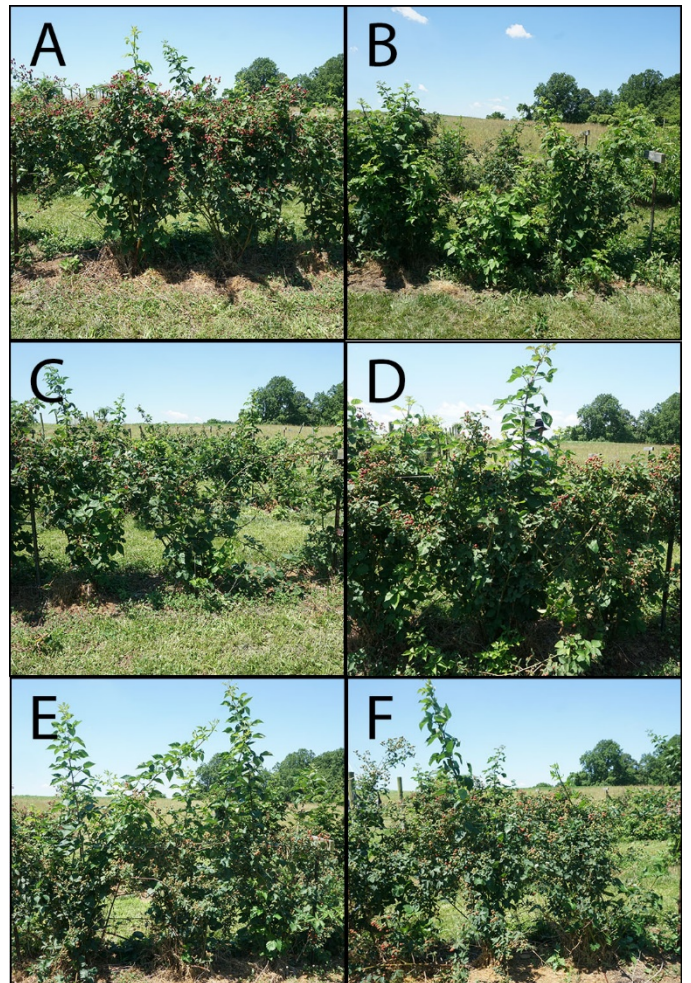


Figure 1. Representative plots of each blackberry cultivar tested: A) Arapaho, B) Freedom, C) Natchez, D) Osage, E) Ouachita, F) Von.



Figure 2. Floricane fruiting blackberry.

guide recommendations. Weeds were controlled with herbicide application in early summer and mowing between trellised rows. A single application of lambda-cyhalothrin (Warrior II) was made to suppress insect pests, but regular insecticide applications were not made through the season. Fruit loss to insect damage was substantial, and yield values are expected to be higher with better insect scouting and management. Therefore, this year's yield data mainly highlight differences in yield between cultivars, and do not necessarily represent the actual yield potential for any individual cultivar. The primary insect pests observed this year were spotted wing drosophila (*Drosophila suzukii*), potato leafhopper (*Empoasca fabae*) and brown marmorated stink bug (*Halyomorpha halys*).

Assessments were made of the vegetative growth and relative vigor of each blackberry cultivar on June 26, prior to initiation of berry harvest (Table 1). Ripe berries were picked weekly between July 13 and August 10 and weighed to determine yield per replicate. Because replicates had uneven plant survival, we then divided the yield values by the number of surviving plants to present yield on a per-plant basis as well as a per-plot basis (Table 1). A subsample of harvested berries were counted and weighed separately to determine average berry size. Yield totals for the entire season are summarized in Table 1, with Arapaho, Von, and Osage producing the highest yield on a per-plant basis during the harvest period. However, differences between cultivars were not statistically significant, because of high variation in yield within each cultivar. Figure 3 shows differences in timing of fruit production, with Osage peaking earliest in the season (Jul 20), followed by Arapaho and Von the following week (Jul 27). Ouachita had a less pronounced peak, and had similar yields through two weeks of harvest (Jul 20 - Jul 27). Figure 4 shows the mean berry size by cultivar. Arapaho produced the highest yield and the largest berries, while Von and Osage, which produced the second and third highest yields, had the smallest berries on average. These data represent the first year of observations on yield for these cultivars in Maryland, and multiple years of data will be required to draw any generalizations about the performance of these cultivars under growing conditions in this state. However, early observations indicate that cultivars Osage and Von are good candidates for commercial production in

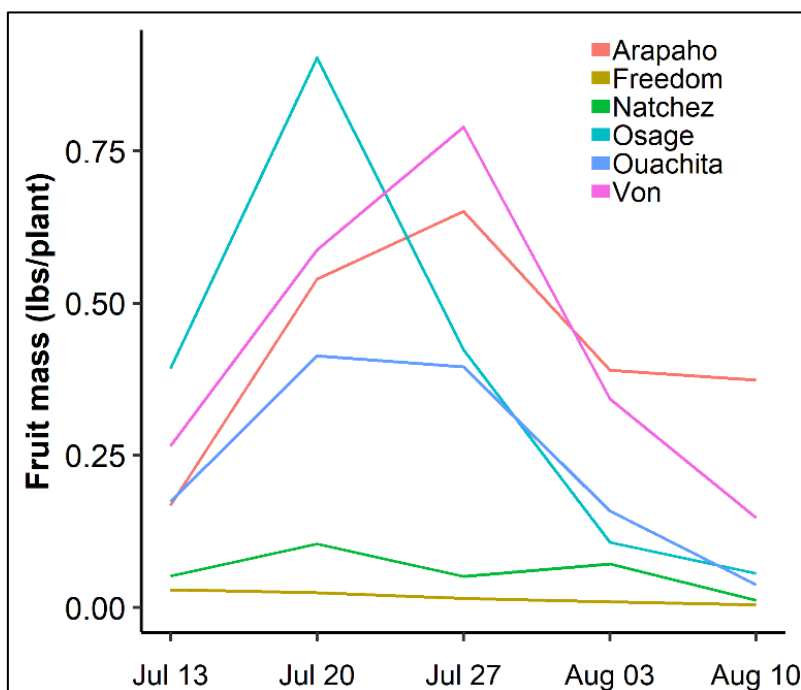


Figure 3. Mean yield per plant through the five weeks of harvest during summer 2020.

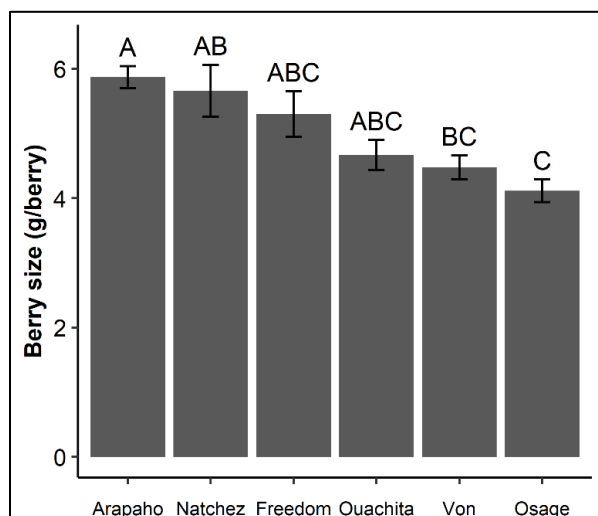


Figure 4. Average berry size for each blackberry cultivar tested. Bars represent standard error of the mean. Different letters indicate significant differences ( $P < 0.05$ )

Maryland. Arapaho had the highest per-plant production, but had the second lowest survival through establishment. One other interesting note was the overall poor performance of Natchez, with the lowest survival (66.7%) and the lowest per-plant yield among floricanne cultivars. Previous trials at CMREC have had good success with this variety, and the poor performance may be related to site differences or problems with nursery stock. Future work will repeat measurements of yield and berry size, and will include measures of berry quality and flavor parameters for each cultivar. The overall goal is to provide objective assessment of the quality of these different blackberry cultivars for the Maryland farmer.

Table 1. Mean plant survival and yield on a per-plant basis for the six blackberry cultivars tested. Note that Freedom is primarily a primocane-fruiting cultivar, so the main harvest will be later in the season

Cultivar	Survival (%)	Floricanne (ft)	Primocane (#)	Vigor (scale 1-5)	Yield (lbs/plant)	Yield (lbs/plot)
Arapaho	75.0	4.25	1.7	2.9	2.88	6.39
Freedom	75.0	1.75	4.1	1.5	0.08	0.22
Natchez	66.7	3.12	1.2	1.3	0.29	0.53
Osage	100	6.50	4.2	4.4	1.88	5.65
Ouachita	91.7	4.75	3.4	3.1	1.18	3.38
Von	100	4.13	3.9	2.8	2.13	6.40

### Blueberry Cultivar Trials:

A blueberry trial was established in the fall of 2018, building upon findings from a previous study of rabbiteye and southern highbush cultivars. These new cultivars are better adapted to the hotter climatic conditions and soil types encountered in Southern Maryland. Some cultivars will offer an extended harvest season for fresh market sales. Cultivar selections for this trial focused on berries with potential for good fresh market sales appeal as well as climate/soil adaptation. Cultivars under evaluation include Ozark Blue, Onslow, Legacy, Oneal, Ochlockonee, Overtime, Calypso, and Top Shelf (Fig. 5).

The planting was established in a complete randomized block design with four replications. Each plot consisted of four plants spaced 42 inches apart in row. Rows are spaced 10 feet apart. Soil was

modified to a pH of 4.8 prior to planting. After planting, the rows were covered with 2 inches of Leaf Gro Gold compost material from the Prince George's County Western Branch Recycling Facility. Fertilizers and protective fungicides were applied according to production guide recommendations. Weeds were controlled with herbicide application in early summer and mowing between crop rows. Irrigation was applied through drip tape applied along the row. Berries were removed in the first and second leaf (spring of 2019 and 2020). Data were collected on plant survival, cane length and plant vigor. A summary of 2020 observations are presented in Table 2. A partial first harvest is anticipated during the third leaf in the summer of 2021.

*Table 2. Vegetative characteristics of eight blueberry cultivars.*

Cultivar	Survival (%)	Cane length (in)	Vigor (scale 1-10)
<i>Calypso</i>	93.8	21.5	4.0
<i>Legacy</i>	81.3	22.5	4.3
<i>Ochlockonee</i>	100	25.5	6.0
<i>Oneal</i>	81.3	24.2	4.0
<i>Onslow</i>	75.0	19.8	3.8
<i>Overtime</i>	100	30.5	6.0
<i>Ozark Blue</i>	6.3	12.0	2.0
<i>Top Shelf</i>	100	19.8	4.8





*Figure 5. Representative blueberry plants: A) Calypso, B) Legacy, C) Ochlockonee, D) Oneal, E) Onslow, F) Overtime, G) Ozark Blue, H) Top Shelf.*

#### **Primocane Raspberry Ripening Period:**

Cultivars Caroline and Josephine are being evaluated under different pruning programs to alter ripening periods (Fig. 6). The study will attempt to manipulate fruit ripening time to avoid damage from spotted wing drosophila (SWD). The trial was established in the spring of 2018 and consisted of 4 replications in a randomized complete block design. Each plot contained four plants planted 24 inches apart. For the initial two years, data were collected on plant vigor and survival. Fertilizers and protective fungicides were applied according to production guide recommendations. Weeds were controlled with herbicide application in early summer and mowing between trellised rows. A single application of lambda-cyhalothrin (Warrior II) was made to suppress insect pests, but regular insecticide applications were not made through the season. Once the planting is well established, different pruning timings and heights will be evaluated to alter fruit maturity and the incidence of SWD. In 2020 observations, SWD was found during the last week of June in ripe florican raspberry fruit of both cultivars (Fig. 7). 100% of plants survived into the third year. Caroline was slightly more vigorous and had better density than Josephine (Table 3).



Figure 6. Representative plants of raspberry cultivars tested: A) Josephine, B) Caroline.



Figure 7. Spotted wing drosophila larva in raspberry fruit.

Cultivar	Density		Vigor	
	high	low	high	medium
<i>Caroline</i>	4	0	3	1
<i>Josephine</i>	2	2	1	3

Table 3. Ratings for vegetative growth characteristics of raspberry cultivars. Number of plots with each rating presented. For example, for Josephine, two plots had high density and two plots had low density.