2018 Horticulture Demonstrations

The Impact of Mineral Particle Film on Blackberry Diseases and Insects and Primocane Fruit Quality and Yield (SARE Funded Grant $174,290 for a 2 year project) Note: we filed for a 6 month NCE (no cost extension) and it was approved

Cooperators: Gillam/Ritter Farms of Arkansas, Judsonia, AR, Sta-N-Step Farm Fayetteville, AR and Moss Springs Farm, Bowie County, Texas
Specialists' assistance: Dr. Terry Kirkpatrick, Dr. Donn Johnson, Dr. Karen Ballard, Dr. Jennie Popp

Production of Fall Primocane-fruiting Blackberries
Issue/Problem/Relevance: The new cultivars of primocane-fruiting blackberries produce fruit in the late summer and fall when the market price for blackberries is high. However, production and pest management practices need to be optimized for these cultivars and find ways to achieve fruit set when temperatures exceed 90°F which can reduce fruit set. The goals of this SSARE project were: to demonstrate to blackberry growers the importance of primocane-fruiting blackberries in commercial horticulture operations as a way to extend harvest in the fall when market prices are at peak; to demonstrate that high late summer temperatures in the southeastern states can be managed with mineral particle films (kaolinite) sprays; and to determine if mineral particle film sprays can provide protection from various insects and diseases.
Action/Response:
These studies occurred in three commercial blackberry farms near Tontitown and Searcy, AR and New Boston, TX. In 2016, a 4-year-old Prime-Ark® 45 primocane-fruiting blackberry planting Near Searcy, AR had four rows each with four treatment plots of 5 plants spaced 2 ft apart. In April 2016, the Tontitown, AR and New Boston, TX growers planted Prime-Ark® Traveler primocane-fruiting blackberry plants 2 ft apart in each of 16, 18 ft plots. Each planting was trellised and primocanes were allowed to grow to 2 to 3 ft height and laterals to 2 ft length before being tipped to increase number of fruiting terminals and yields. These plants were trickle irrigated as needed and fertilized similarly to floricane blackberry cultivars. Fruit yields per plot were recorded twice weekly. Production practices affecting canopy temperature and pest/disease management were compared using four treatments: 1) whitewashing plants with Surround mineral particle film; 2) whitewashing plants and applying insecticides or fungicides as recommended by weekly scouting; 3) applying insecticides or fungicides only; and 4) untreated plants. From 1 June through 21 August 2017, temperature loggers recorded temperatures at half hour intervals of ambient air at 3 ft height near the blackberry canopy and two micro sensors gator clipped to underside of separate blackberry leaves at 1 ft and 3 ft height inside the canopy of each of these four treatment plots (four replicates). During harvest, recorded the numbers of spotted wing drosophila reared per harvested berry per plot, weekly noted numbers per plot of stink bugs, Japanese beetles, green June beetles and numbers of mites per terminal leaf and assessed incidence of anthracnose. On 15 August, 2018 we broadcast live from the commercial blackberry farm in Tontitown, AR a Virtual Field Trip: Fall producing

blackberry production system (online: https://youtu.be/TZnuW-KA5CQa). Sherri Sanders was the MC for this production. John Clark compared differences between floricane-fruiting and primocane-fruiting blackberry cultivars. Donn Johnson reviewed blackberry insect management, Terry Kirkpatrick reviewed blackberry diseases, and Jennie Popp and Leah English presented their blackberry budgets adapted for primocane cultivar production. We also heard from each of the participating growers about what they learned from this project. This multidisciplinary live broadcast was supported by a production team including Mary Poling, Vonda Nutt, Kerry Rodtnick, Nick Kordsmeier, Chris Meux, Karen Ballard, Julie Robinson, Amanda McWhirt, and Jackie Lee.

Outcomes/Results:

From sunrise to sunset, a comparison was made of temperatures of ambient air next to blackberry row versus those on underside of leaves with or without whitewash of Surround. During the day, the whitewashed blackberry canopies were frequently 0 to 6°F (mean of 2°F) cooler than the ambient air compared to a difference at night of only 0 to 3°F (mean of 1°F). There were no significant differences in treatment plot mean yields in either location. From 10 May to 18 June 2018 at the Tontitown, AR planting, the whitewashed appearance of blackberry plants required four re-applications of Surround after rains greater than 0.25 inches washed off the Surround. In 2018, whitewashing sprays ended when the first green berry appeared. This earlier whitewash cutoff date was to minimize the white mineral film (kaolin clay) residue on harvested berries. Growers determined that the white residue was difficult to completely remove by a water wash and felt the consumer would not do a water wash. On 19 January 2017, the grower in Tontitown, AR was videotaped as he demonstrated winter pruning of 9-month old primocane-fruiting blackberry plants to retain four or five of the strongest floricanes (Link: https://www.uaex.edu/farm-ranch/crops-commercial-horticulture/sare-blog/sta-n-step-farm.aspx). The University of Arkansas System Division of Agriculture Department of Communications collaborated with Amanda McWhirt and Jackie Lee who coordinated the four seasonal sessions of the 2017 Arkansas Blackberry School to produce a "How To" Video Series available online (link: https://www.uaex.edu/farm-ranch/crops-commercial-horticulture/horticulture/commercial-fruit-production/blackberry-school.aspx). This included several videos from this SSARE project: 1) Spotted wing drosophila and broad mite management in blackberry; 2) How to: spotted wing drosophila ID and trapping in blackberry both by Donn Johnson; 3) using interactive fruit budgets a focus on blackberries by Leah English and Jennie Popp; and 4) How to: identifying anthracnose in blackberry by Sherrie Smith. On 15 August 2018, the project

team produced a 59 min. Virtual Field Trip titled, Fall producing blackberry production system. This was live broadcast internationally to registered sites including Ghana, China, Greenland, the United Kingdom, and to 30 states within the US with a total of 279 participant locations including 177 small fruit producers, 114 Master Gardeners. Links to the Blackberry Virtual Field Trip video recording, transcript, and other educational resources were made available at this SSARE project blog site (link: https://www.uaex.edu/farm-ranch/crops-commercial-horticulture/sare-blog/posts/oh_what_a_field_trip.aspx). These resources provide timely information regarding the differences between production practices for floricane-fruiting and primocane-fruiting crops. The SSARE project identified: effects of whitewashing blackberry plants with Surround mineral film (kaolin clay) to reduce canopy temperature and suppress disease and pests; a lack of grower acceptance of clay residue on whitewashed berries; benefits of using farm planning and interactive budgeting tools; and grower observations of how production practices need to be modified to produce primocane-fruiting blackberry cultivars in Arkansas and northeast Texas.

Broad Mite Demonstration on Blackberries

Cooperators: Ritter Farms, Judsonia, AR

Specialist assistance: Dr. Donn Johnson

For over a century, broad mite, *Polyphagotarsonemus latus* (Banks), has been a worldwide subtropical or greenhouse pest of 60 plant families. Growers from around the US are noticing the increasing nationwide problems with broad mite reducing yields and quality of several high-value fruits. In 2006, broad mites first caused terminal leaf and fruit bud damage to primocane-fruiting blackberry cultivars. As of 2017, yield loss of primocane-fruiting blackberry cultivars and some floricane-fruiting cultivars has

occurred in over 15 states. An effective broad mite pest management program is being developed for blackberry.

Description: The broad mite damages terminal leaves, flowers and fruit on citrus, peppers, tomatoes and recently became a pest of blackberries, especially primocane-fruiting cultivars. This mite feeds by piercing the bud, leaf or flower. This feeding injects a toxin that stunts growth, curls and bronzes leaves and often kills terminal and lateral leaf and flower buds (looks like fire blight).

Eggs are oval and spotted (0.08 mm long) and the broad mites are oval and vary from small white immature to amber adults with white hour-glass marking on back (0.2mm).

Primocane-fruiting blackberry cultivars usually have floricanes pruned to ground, removed and burned by bud break. This practice produces a late-summer and fall crop. From late-May through fall in Arkansas, you can find a buildup of broad mite numbers on terminal leaves of emerging primocanes. Broad mites have damaged floricane-fruiting blackberry cultivars. These mite-infested floricane blocks appear to have delayed bud break and low vigor in spring. Broad mites can be found on terminal floricane leaves from April until after mid-summer harvest when floricanes are usually removed.

Methods

Field: A commercial planting of Prime-Ark45® blackberries near Searcy AR experienced broad mite damage for the last several years. This planting was used in 2015, 2016, 2017 and 2018 to determine where broad mites overwinter. In 2016, field efficacy tests were conducted releasing two predatory mite species, *Neoseiulus cucumeris* or *Neoseiulus swirskii*, and applying two miticides, Microthiol (sulfur) and Agri-Mek. Five, 300 ft rows were subdivided into twelve, 25 ft plots between trellis posts. Randomized plots (five replicates) were either treated with: 1) untreated control; 2) Microthiol (7 and 20 May); 3) released *N. cucumeris* or 4) *N. swirskii* (20 May and 7 July). Two additional plots per row were used to investigate pest density phenology within fields. This one acre block of 15 rows was treated with Agri-Mek on 15 and 22 July when mites were consistently above 10 mites per leaflet with damage seen across the block.

Predatory mites are sold commercially in sachets ready to hang within the canopy of

the crop (see photo). For best results, sachets need to be hung in the upper canopy of blackberries away from direct sunlight. A food source is supplied in each sachet allowing predatory mites to continuously develop and emerge for 6 weeks via two small holes. *N. cucumeris* was supplied as 1000 predatory mites per sachet. *N. swirskii* was supplied as 250 predatory mites per sachet. Treatments 3 and 4 used 12 sachets/plot the first release, followed by 10 sachets/plot 6 weeks later. Weekly, 5-10 leaves were taken from each treatment plot and recorded the number of broad mites per leaflet. These data were used to better understand seasonal changes in broad mite densities across a planting and after various treatments.

Bioassay: Five leaflets (5 replicates) were dipped and swirled for 5 seconds in a treatment solution, air dried for 30 minutes on paper towels and placed underside up on sponge in a petri dish. The petiole was covered with the moistened Kimwipes and maintained at 73^0F in the laboratory. A stereomicroscope was used to aid in counting the number of dead or live broad mites within a leaf area along the midrib (½" x ¾").

Results

Field: Broad mites overwinter under blackberry bud scales and in the soil. The use of Microthiol (sulfur), *N. cucumeris* and *N. swirksii* kept broad mite counts below the threshold of 5 mites per leaf until 29 June compared to the untreated check that exceeded threshold by 10 June. On 22 June, there were only three "hot spots" within the field above the action threshold. By 29 June and 7 July, a third and all plots exceeded the action threshold, respectively. Therefore, 15 and 22 July the entire field was treated with treated with Agri-Mek which reduced broad mite counts to near zero in all these treatment plots.
Bioassay: Other treatments that caused more than 90% broad mite mortality within 72 hours included: Agri-Mek; 1% or 2% M-Pede; 10 lbs or 15 lbs Microthiol; and 2% JMS Stylet Oil. Future field treatments of these and other products will be conducted to determine where each may fit into a resistance management program for broad mites on blackberries or other crops

Recommendations

Monitoring: Mites may be present at almost any time of the year, although densities are highest during mid- to late-summer on the younger foliage on terminals. In comparison, two-spotted mites first buildup on and bronze leaves in the lower canopy and slowly move up the plant. From mid-May on, especially in primocane-fruiting cultivars, keep an eye out for symptoms of leaf bronzing or cupping of new terminal growth. Use a 20X magnification lens to check these leaves for presence of broad mites. *Apply miticide only if/when* you detect new terminal leaf damage and leaflet samples average between one to five active broad mites per leaflet. New monitoring methods are still be perfected for use by growers to detect broad mite densities above threshold.

Management (from MP144 2018 Insecticide recommendations for Arkansas):

Broad mites are somewhat protected in the terminal growth, so miticides with translaminar (penetrating the leaf) activity are more likely to be effective than miticides that have only contact activity. One such product is Agri-Mek SC. In 2016, Syngenta acquired an EPA FIFRA Section 2(ee) recommendation for Agri-Mek® SC for use in AR, FL, IL, IN, NC, PA, and SC for control of broad mites in caneberry. Agri-Mek is a restricted-use material with only two applications allowed per season. Agri-Mek SC has a 7-day PHI. Agri-Mek SC applied at rate of 3.5 fl oz/acre must be mixed with a non-ionic surfactant activator type wetting, spreading and/or penetrating spray adjuvant at 0.1-0.5% v/v.

Blackberry Demonstration – Primocane and Traditional Blackberries

Cooperator: Pioneer Village – City of Searcy (Master Gardener project)
Specialist assistance: Amanda McWhirt

On May 24, 2017 we planted Osage, Ouachita and Prime-Ark Traveler blackberry plants at Pioneer Village which is a public garden in Searcy. This garden has over 10,000 visitors each year. This can be used to demonstrate fruit and plant characteristics of Arkansas bred and grown varieties and our recommendations for best management of traditional and primocane fruiting blackberries. Soil samples were taken

and recommendations followed. Trellising will go up soon as the plants require it Master Gardeners will assist with weekly watering schedule as we have no irrigation installed. This garden is a replica of what one would see in the late 1800's and early 1900's and the goal is to keep it true to that time period. In 2018, Master Gardener volunteers constructed a trellis system for the blackberry plants in keeping with the pioneer times. The plants have been fertilized, monitored for diseases and insects and pruned according to the U of A recommendations. This demo has been promoted on Facebook, Twitter and in horticulture and Master Gardener newsletters, reaching 10,000+ people not including the visitors to Pioneer Village each year.

Tomato Demonstration
Cooperator: Joe and Marilyn Sims
Specialist assistance: Dr. Amanda McWhirt, Jackie Lee and Hank Chaney

Along with 30+ agents statewide, I conducted a tomato demonstration in White County. The purpose of the tomato demonstration was to compare how pruning affects the health and yield of tomato plants. I planted my demo on April 24, 2018 with 12 plants after soil sampling and amending the soil according to our U of A recommendations. The cooperator and I measured yield by recording the number of tomatoes produced; weighing the tomatoes and recording the harvest dates. It was also crucial to maintain a pesticide program since tomatoes are prone to many diseases and insect pests. Fungicide applications were made on June 6, July 2 and July 25. Yield data collected will be weight and number of tomatoes produced from the pruned and non-pruned tomato plant. The following You tube video created by Amanda McWhirt served as a guide and was utilized to assist in making pruning decisions. https://www.youtube.com/watch?v=_fSfuBsE6L4

Harvest Data Sheet										
	Pruned					Un-pruned				
Date	# of Plants	Marketable Fruit		Cull Fruit		# of Plants	Marketable Fruit		Cull Fruit	
		# of Fruit	*fruit Weight* oz	*# of Fruit*	*fruit Weight* oz		*# of Fruit*	*fruit Weight* oz	*# of Fruit*	*fruit Weight* oz
7/5/2018	6	8	32	1	4	5	4	30	4	30.5
7/8/2018	6			1	3	5			1	7
7/10/2018	6	2	14	2	3	5	1	3	1	5
7/11/2018	6			4	2	5			3	2
7/13/2018	6	5	19	6	5	5	4	16	3	1
7/14/2018	6			1	2	5			7	14
7/15/2008	6	7	14	4	12	5	2	11	2	3
7/16/2018	6			3	11	5			1	1
7/18/2018	6	4	21			5			1	1
7/20/2018	6	3	18			5			1	4
7/21/2018	6	5	18			5	1	2	1	3
7/22/2018	6	4	16	1	3	5			1	1
7/25/2018	6	2	11			5			1	2
7/26/2018	6	1	8			5	1	3	1	2
7/30/2018	6	1	6			5			1	1
7/31/2018	6	3	9			5			1	2
8/2/2018	6	3	12	4	7	5			1	6
8/4/2018	6	5	21			5	4	9	1	3
8/7/2018	6	2	11			5			1	1.5
8/11/2018	6	2	6			5			1	3
8/14/2018	6					5			1	2
8/16/2018	6	3	11			5			1	1
8/20/2018	6			2	6	5				
8/21/2018	6	1	5			5				
8/24/2018	6	2	5			5	7	11		
8/26/2018	6	2	7			5			2	6
8/30/2018	6	6	28	6	19	5			10	55
9/5/2018	6	9	37			5	11	58		
9/9/2018	6	8	48			5	10	50	12	60
9/13/2018	6	11	44			5			2	8
9/19/2018	6	5	25	2	7	5	13	66		
9/27/2018	6	6	30			5	11	44	7	45
10/10/2018	6	2	12			5			4	3
10/13/2018	6	3	18	4	16	5	6	34	5	30
10/18/2018	6	8	28			5	8	19	4	16
10/21/2018	6	8	11			5	1	5		

Results: In the beginning the pruned plants seem to yield better quality marketable fruit. This can be linked to the proper air circulation in the plant canopy which allowed for faster ripening and less disease pressure. However, my cooperators chose to keep their plants and harvest fall tomatoes since they were still blooming in late August. While most agents stopped their demo in late summer, we continued until frost. Our demo was completed on October 21, 2018. The fall crop of tomatoes provided us with some interesting data. We harvested 288 ounces of marketable fruit from 6 pruned

plants from August 30 till October 21 and a whopping 276 ounces of marketable fruit from only 5 surviving un pruned plants in that same time period. One might could make the argument that pruning plants in the fall might not be as necessary as it is for the summer season. We hope to continue this demo again in 2019. This was promoted through social media reaching over 5000 people. A field day was held at the garden where 8 people visited and learned about our findings. During the season, over 29 people toured the garden site to learn about growing and pruning tomatoes. Information was distributed in the Master Gardener newsletter and the horticulture newsletter reaching 330 commercial and homeowner horticulture enthusiasts.

Spotted Wing Drosophila Monitoring Program

Cooperators: Ritter Farms of Arkansas

Implemented a weekly Spotted Wing Drosophila monitoring program to assist the new owners of Ritter farms, previously Gillam Farms. Traps were placed in the (4) plots and (2) on the perimeter and were monitored weekly for the presence of Spotted Wing Drosophila. The threshold for SWD is 1 insect. Upon positive identification of the first confirmed catch the producer began his spray program. Traps remained to determine efficacy of chemical applications. As the season progressed, the chemical applications increased twice weekly to eradicate larvae in fresh picked berries. Todd Gibson, the farm manager expressed his appreciation for our trapping and guidance in timing of applications. He was trying to build new markets for their fresh local grown fruit and to have a new customer discover larvae in their product would have been detrimental to that newly built relationship. On the farm alone over 350 acres of traditional and primocane fruiting blackberries were protected from damage of the SWD. I personally ran and hired trap runner from SARE grant funds to monitor traps on weekly basis for 35+ weeks. Information was disseminated to the public in a variety of ways:

Wrote 4 articles for the Arkansas Democrat Gazette and local regional papers reaching a total combined circulation of 50,000+

Promoted program through SARE Blackberry Virtual Field Trip, social media and newsletters reaching 12,323 people through direct and indirect contacts

Educated 4140 clientele on identification and IPM management practices

2019 Horticulture Demonstrations

Tomato Demonstration

Cooperator: Keith and Elaina Martin

Specialist assistance: Dr. Amanda McWhirt and Hank Chaney

Along with 30+ agents statewide, I conducted a tomato demonstration in White County. The purpose of the tomato demonstration was to compare three different varieties. Soil samples were taken, and the area was amended according to our U of A recommendations. The demo was planted on April 12, 2019 with 6 plants each of Celebrity, Cherokee Purple and Sungold. The cooperator measured yield by recording the number of tomatoes produced; weighing the tomatoes and recording the harvest dates. It was also crucial to maintain a pesticide program since tomatoes are prone to many diseases and insect pests.

Results: The Sungold plants grew well and produced well. In fact, they did too well as the cooperator determined they only needed two plants due to the overabundance of tomatoes. The Celebrity plants did well, maintained vigor and produced quality, tasty fruit. The cooperator was not impressed with the Cherokee Purple as they exhibited knotty spots in the fruit and seemed to rot quicker than the other two varieties.

He stated, "The Heritage tomatoes are no longer grown for a reason." Obviously, he was not impressed with the Cherokee Purple variety. This demonstration was promoted through social media reaching over 5000 people. During the season, 5 videos were used to promote the tomato demo and the University of Arkansas Division of Agriculture. Information was distributed in the Master Gardener newsletter and the horticulture newsletter reaching 330 commercial and homeowner horticulture enthusiasts. There were 9235 indirect and 872 direct contacts through Facebook and Twitter social media platforms.

Turfgrass Weed Control at Daniel Park and Spring Park

Cooperators: City of Beebe
City of Searcy
Assistance: Blair Griffin

On March 6, 2019 a replicated turfgrass weed control demonstration was conducted at Spring Park in Searcy and Daniel Park in Beebe.

Spring Park
Treatment 1: Trimec
Treatment 2: Trimec and Princep
Treatment 3: Manor

Treatment 4: Roundup
The turf area of the park received an application of Roundup and Manor.

Daniel Park
Treatment 1: Trimec
Treatment 2: Trimec and Princep
Treatment 3: Manor
Treatment 4: Roundup

The turf area of the park received an application of Roundup and Manor.

The treatments were rated on 5/23/19:

Treatment #	Bluegrass control	Garlic control	Chickweed control	Spurweed control
1	0%	80%	100%	100%
2	70%	80%	100%	100%
3	0%	95%	100%	100%
4	90%	95%	100%	100%

Searcy Parks and Recreation stated they saved over $5000 of their budget due to our assistance through herbicide demonstrations. City employees learned to properly calibrate and time herbicide applications in city parks and athletic fields. The cost savings were separated into labor costs, fuel costs, product costs, general maintenance of equipment for 3-4 less mows/month.

"Our parks have never looked as good as they have this year. The weeds are gone and the grass looks great. Thank you for
your help." Mike Parsons, Director Searcy Parks and Recreation.

This information was shared on social media platforms, through the White County Horticulture newsletter reaching a total of 14235 indirect and 1123 direct contacts. Moreover, the area at Spring Park was utilized as a field day training for 22 new county agents from across the state as a part of a horticulture training.

Landscape Weed Control Demonstration at the Legion Building

Cooperator: City of Searcy
Assistance: Blair Griffin

On March 6, 2019 a landscape weed control demonstration was conducted at the Legion building in Searcy.
Treatment 1: Roundup
Treatment 2: Roundup (1qt), Manor, (.3 oz), Barricade (1 lbs)
The treatments were rated on 5/23/19 and photos were taken for comparison. Signage was placed in this highly visible location on the courthouse square. It's estimated that over 20000 drivers pass by daily. The information was uploaded on social media (Twitter and Facebook) and distributed in the White County Horticulture newsletter, reaching over 14,500 contacts.

Landscape Weed Control Demonstration at Spring Park and Daniel Park

Cooperators: City of Searcy
City of Beebe
Assistance: Blair Griffin

On March 6, 2019 a replicated landscape weed control demonstration was conducted at the Spring Park in Searcy and at Daniel Park in Beebe.

Spring Park
Treatment 1: Glyphosate (1 qt) and Simazine (1 qt)
Treatment 2: Simazine (1 qt)
Treatment 3: Simazine (1 qt) and Prodiamine (1 lbs)
Treatment 4: Simazine (1 qt) and Metolachlor (1 pt)
Daniel Park
Treatment 1: Glyphosate (1 qt) and Simazine (1 qt)
Treatment 2: Simazine (1 qt) and Metolachlor (1 lbs)
Treatment 3: Simazine (1 qt) and Metolachlor (1 pt)

The treatments were rated on 5/23/19 and photos were taken for comparison:

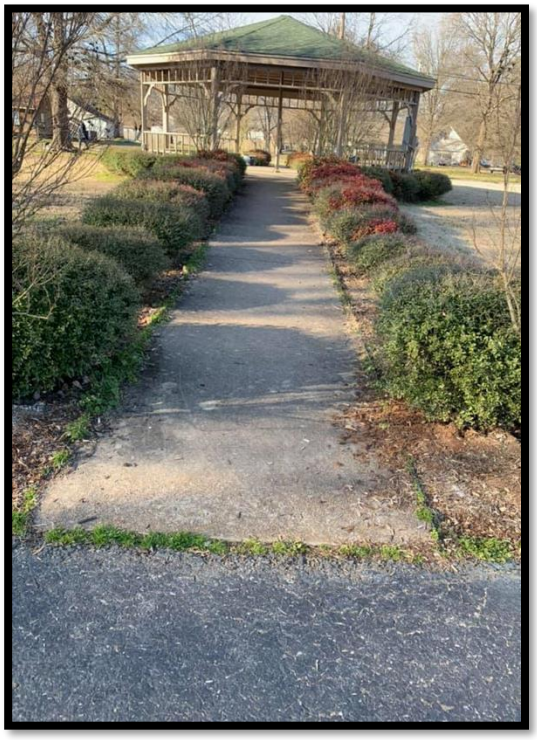
Spring Park

Treatment #	Bluegrass control	Violet control	Chickweed control
1	100%	80%	100%
2	80%	80%	100%
3	100%	95%	100%
4	90%	95%	100%

Daniel Park

Treatment #	Bluegrass control	Violet control	Chickweed control
1	100%	80%	100%
2	80%	50%	100%
3	90%	60%	100%

Signage was placed in both parks. It's estimated that over 31000 people visit or drive by the two parks daily. The information was uploaded on social media (Twitter and



Facebook) and distributed in the White County Horticulture newsletter, reaching over 21,232 contacts. A field tour was conducted as a part of the annual White County Master Gardener training, reaching another 45 people directly.

Weed Control Demonstration in Commercial Blackberries

Cooperator: Ritter Farm
Assistance: Blair Griffin

On March 26, 2019 a weed control demonstration was conducted at Ritter Farms on 6-year-old commercially grown blackberries.

Six treatments were compared:
Treatment 1: Gramoxone (1 quart/acre)
Treatment 2: Gramoxone (1 quart/acre) and Princep (1quart/acre)
Treatment 3: Gramoxone (1 quart/acre), Princep (1 quart/acre), and Surflan (2 qt/acre)
Treatment 4: Gramoxone (1 quart/acre) and Chateau (6 oz/acre)
Treatment 5: Gramoxone (1 quart/acre) and Princep (1qt/acre) – up to first trellis wire
Treatment 6: Gramoxone (1quart/acre) and Princep (1qt/acre) – up to second trellis wire

Treatments were rated on 5/23/19, resulting in 20% cane tissue injury on Treatment 5 and 50% cane injury on Treatment 6. The “Cadillac treatment -#3”, was 80% effective however, most likely not cost effective. Treatments 1 and 2 demonstrated 75% weed control and were more economical than treatment 3.

Blackberry Demonstration – Primocane and Traditional Blackberries (multiyear project)

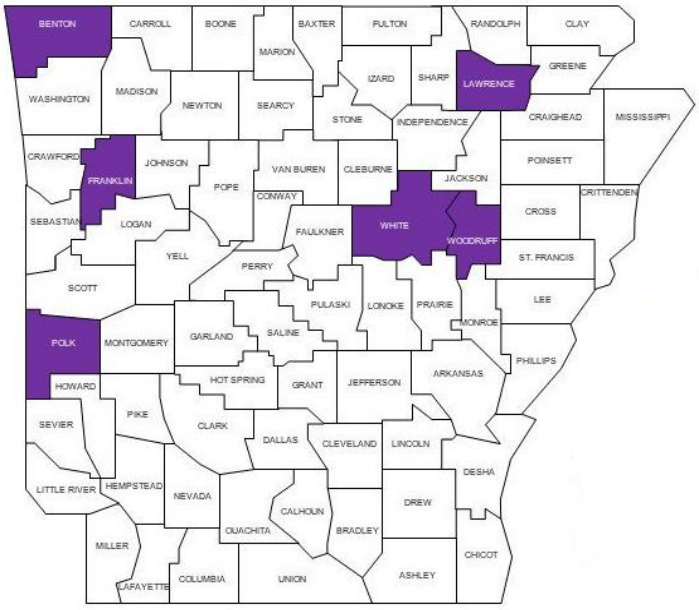
Cooperator: Pioneer Village – City of Searcy (Master Gardener project)

Specialist assistance: Amanda McWhirt

2019 County Agent Blackberry Demo

By Lizzy Herrera, Bryce Baldridge, Sherry Beaty, Brett Gordon, Ryan Neal, Sherri Sanders, Jesse Taylor, and Amanda McWhirt

The University of Arkansas Fruit breeding program is responsible for releasing blackberry varieties that are important to blackberry production across the United States and world. To demonstrate the value of these improved blackberry varieties six University of Arkansas county agents from across the state (Benton, Franklin, Polk, Lawrence, White, and Woodruff) established demonstration plots to showcase how these varieties perform in different parts of Arkansas (Figure 1). During the 2019 season blackberry average berry weight and flavor were monitored throughout the season by county agents.



The blackberries demonstrations were planted in 2017 with Osage, Ouachita and Prime-Ark® Traveler being the three main varieties used in all six counties. However, other Arkansas varieties such as Prime-Ark® Freedom, Prime-Ark® 45 and Natchez were also planted in Franklin County. Tissue culture plug plants were used for the Osage, Ouachita and Prime-Ark® Traveler plantings. A standard fertility and pest management program was provided to each agent and plants were allowed to establish over the 2018 season. During the 2019 season agents harvested berries over several weeks and recorded the average weight of individual berries and recorded their observations.

The varieties included in this study vary in their fruiting characteristics and in ripening time, which allows for the possible extension of the blackberry season, especially with the combination of floricane (F) and primocane (P) fruiting varieties.

The plants have been fertilized, monitored for diseases and insects and pruned according to the U of A recommendations. This demo has been promoted on Facebook, Twitter and in horticulture and Master Gardener newsletters, reaching 10,000+ people not including the visitors to Pioneer Village each year

Results

All the varieties used in the demonstrations have previously been tested extensively at the University of Arkansas Fruit Research Station in Clarksville, AR. Most of the average berry weights for the varieties tested reached the estimated average for that variety, with some counties exceeding or falling just short of that estimate.
Variety differences in average berry size were consistent across all locations within the state during 2019, with Prime-Ark® Traveler (floricane) having the highest average berry weight amongst most of the counties, followed by Ouachita and Osage.

For most of the varieties, the berry weight either remained relatively the same or slowly decreased throughout the season.

Agents also collected data on berry flavor and quality. Prime-Ark® Traveler and Osage appeared to be the favorites for a few of the counties for flavor.

Table 2. Comments collected during 2019 Arkansas Blackberry Demonstration on Fruit Flavor and Quality.

	Natchez	Osage	Ouachita	Prime-Ark® 45	Prime-Ark® Freedom	Prime-Ark® Traveler
Franklin	Tart	Strong flavor	.	Best tasting	.	Good quality
Lawrence	.	Excellent taste	Very tart and small	.	Good taste	.
Polk	.	Most volume	Smallest berries	.	.	Biggest berries
White	.	Good	Good	.	.	Great
Woodruff	.	.	.	.	.	Largest, very sweet

Overall, Arkansas released varieties have shown to do very well in the state and to be adaptable to a wide range of areas. The importance of plant health for berry size and flavor were also observed. For more information on growing blackberries: https://www.uaex.edu/farm-ranch/crops-commercial-horticulture/horticulture/commercial-fruit-production/blackberry-school.aspx

Spotted Wing Drosophila Monitoring Program

Cooperators: Ritter Farms of Arkansas

Implemented a weekly Spotted Wing Drosophila monitoring program to assist Ritter Farms. Traps were placed in the (4) plots and (2) on the perimeter and were monitored for the presence of Spotted Wing Drosophila. The threshold for SWD is 1 insect. Upon positive identification of the first confirmed catch the producer began his spray program. Traps remained to determine efficacy of chemical applications. As the season progressed, the chemical applications increased twice weekly to eradicate larvae in fresh picked berries.

Matt Wilson, Operations manager, expressed his appreciation for our trapping and guidance in timing of applications. He was trying to build new markets for their locally grown fruit. If a buyer/customer discovered larvae in their product it would have been detrimental to that newly built relationship. On the farm alone over 150 acres of traditional and primocane fruiting blackberries were protected from damage of the SWD. Information was disseminated to the public in a variety of ways. Four articles were written for the Arkansas

Democrat Gazette and local regional papers reaching a total combined circulation of 50,000+. This program was promoted through social media and newsletters reaching 12,323 people through direct and indirect contacts.

White County Edamame: Victory Garden

Agents: Jan Yingling & Sherri Sanders

Cooperator: Downtown Church of Christ Victory Garden
Purpose of Demonstration: To demonstrate growing Edamame in a home garden setting and to introduce a healthy protein source to students and adults.

Type/Design of Demonstration: Grow Your Own Protein Program guidelines were used to plant a small sample plot of a non-GMO, Arkansas edamame variety plot in a community garden. The county agents visited the garden at least once per week to monitor the plot and to conduct educational programming.

Materials and Methods:
Field size: 5 ft. x 15 ft. plot
Variety: ArNaSoy 5.6
Planting date: May 22nd, Replanted June 13th
Harvested: September 27th, 2019

Discussion: The plot was soil sampled and hand weeded in preparation for the planting. The Grow Your Own Protein edamame seed was obtained. A required seed inoculum purchased locally was placed on the seeds before planting. The first planting was done on May 22nd by hand across the plot. The plot was in a community garden in Searcy. The Victory Garden is maintained by volunteers and it is managed organically. The sprouts emerged and the volunteers accidentally weeded our plot and destroyed

the first stand. The plot was replanted on June 13th. The plot was watered and weeded weekly. Mid-season we noticed that there was heavy deer injury to our plot. The plants reached R6 growth stage and were hand harvested by pulling up the plants and pulling off the individual pods. The pods were then washed, boiled, and then frozen.

An educational program was given at a Master Gardener meeting where the edamame was seasoned, and a taste testing occurred. Nutritional information and growing recommendations were given as well as healthy recipes for edamame dishes. An evaluation of the program proved that half of our audience would incorporate edamame into their daily diets and a third of them would grow them in their home gardens if the seed was made available. Updates were made during the season social media platforms, reaching 16571 indirect and 1141 direct contacts. Information was disseminated in the White County Horticulture newsletter which reach 326 people representing 36 counties in five different states and in the White County Row crop newsletter reaching 349 people.

2020 Horticulture Demonstrations

Turfgrass Weed Control Demo

Cooperators: Westview Missionary Baptist Church/Ruby Bates
Assistance: Blair Griffin

On April 7, 2020 a turfgrass weed control demonstration was conducted at Westview Missionary Baptist Church on the west side of Searcy.

Treatment 1: 2,4-D - 1 quart/acre
Treatment 2: Metsulfuron - .3 oz/acre
Treatment 3: Trimec – 1 quart/acre
Treatment 4: Roundup – 1 quart/acre
Treatment 5: Atrazine – 1 quart/acre

Treatment 1: 2,4-D 1 quart/acre

Treatment 2: Metsulfuron - 0.3 oz/acre

Treatment 3: Trimec - 1 quart/acre

Treatment 4: Roundup - 1 quart/acre

Treatment 5: Atrazine - 1 quart/acre

Treatment #	Bluegrass control	Garlic control	Chickweed control	Henbit control
1	0%	80%	100%	100%
2	70%	80%	100%	100%
3	0%	95%	100%	100%
4	90%	95%	100%	100%

This information was shared on social media platforms (Facebook and Twitter) and in the White County Horticulture newsletter reaching a total of 16211 indirect and 1823 direct contacts.

Fruit Tree Training and Pruning

Cooperator: The Orchard Project

"Give a man a fish and you feed him for a day; teach a man to fish and you feed him for a lifetime." Demonstrations are an important key to successful educational programs. They show the university research in real world situations and they help teach people through hands-on learning, not just lectures. Another key factor is that they allow the audience to see the agent getting real work done alongside the clientele, which makes agents more relatable. I conducted a hands-on fruit tree pruning and training workshop for the Orchard Project onsite at their West Vine Street property.

The Orchard Project is a community-based hunger program focused on providing sustainable long-term food sources for individuals locally by planting perennial crops such as small fruits and fruit trees. Currently they have a half-acre orchard at 1211 West Vine Street and one at 110 North Oak in Searcy planted with blueberries, raspberries, muscadines, a variety of apples, mulberries, pears, apricots, plums, and peaches. The location on Vine street is a busy pathway for high school students (around 50) who walk to school every day. This is located in an economically disadvantaged neighborhood and the families struggle to put food on the table. The orchard is there to help provide fresh fruit for anyone, especially the youth on their way to and from school. Their motto is, the trees are God's, the fruit is yours.

See their Facebook page here:
https://www.facebook.com/SearcyOrchardProject/?epa=SEARCH_BOX

The workshop was featured on social media and promoted through the White County Horticulture newsletter, reaching 21003 indirect and 2311 direct contacts. We had thirteen participants at the event.

Privet Hedge Control Demonstration in Commercial Blackberries

Cooperator: Ritter Farm
Assistance: Blair Griffin

On June 20, 2020 a privet hedge demonstration was conducted in a commercial blackberry planting at Ritter Farm. The field had once been abandoned and Privet hedge had taken over. The growers have eradicated it in row middles, but it is still prevalent in the rows.

Note: All Privet was at least 18" tall and multi branched. Privet was pruned to ground level by hand pruners and treatments were applied with a sponge brush directly to the bare wood.
Treatment 1: Roundup 50/50 mix
Treatment 2: Roundup 100% concentrate with no added water

Demo was rated on July 14, 2020 and revealed 100% control for both treatments

Landscape Weed Control Demonstration

Cooperator: Westview Missionary Baptist Church/Ruby Bates
Assistance: Blair Griffin

On April 7, 2020 a landscape weed control demonstration was conducted at Westview Missionary Baptist Church on the west side of Searcy.

Treatment 1: Gramoxone 1 qt per acre on the east side
Treatment 2: Gramoxone plus Princep 1 qt on the west half

The plot was rated and we found good control of all weeds present with both treatments. However, we saw some damage on the daylilies and roses too due to high gusts of wind during application. The information was uploaded on social media (Twitter and Facebook) and distributed in the White County Horticulture newsletter, reaching over 14,500 contacts.

Weed Control Demonstration in Commercial Blackberries

Cooperator: Ritter Farm
Assistance: Blair Griffin

On March 20, 2020 a weed control demonstration was conducted at Ritter Farm on 7-year-old commercially grown blackberries.

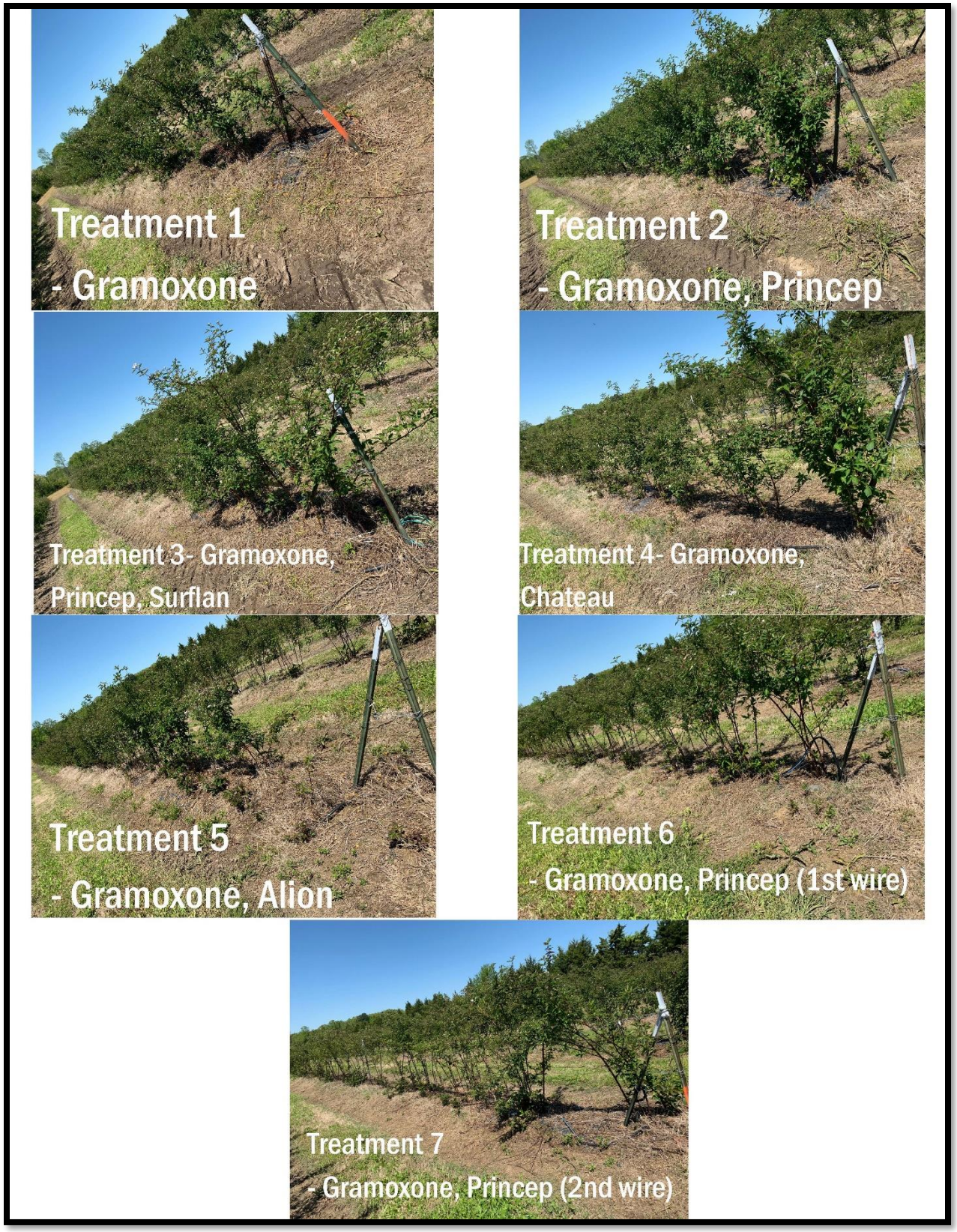
Six treatments were compared:
Treatment 1: Gramoxone (1 quart/acre)
Treatment 2: Gramoxone (1 quart/acre) and Princep (1quart/acre)
Treatment 3: Gramoxone (1 quart/acre), Princep (1 quart/acre), and Surflan (2 qt/acre)
Treatment 4: Gramoxone (1 quart/acre) and Chateau (6 oz/acre)
Treatment 5: Gramoxone (1 quart/acre) and Alion (6 oz/acre) – up to first trellis wire
Treatment 6: Gramoxone (1quart/acre) and Princep (1qt/acre) – up to first trellis wire
Treatment 7: Gramoxone (1 quart/acre) and Princep (1 quart/acre) - up to second wire

.25% surfactant on all treatments

Weeds present: dock, vetch, red deadnettle and chickweed

Note: plots were sprayed with Gramoxone, Princep and Surflan 30 days prior to treatment

Treatments were rated on 5/6/2020 and 6/25/2020, resulting in 20% cane tissue injury on Treatment 5 and 50% cane injury on Treatment 6. The “Cadillac treatment -#3”, was 80% effective however, most likely not cost effective. Treatments 1 and 2 demonstrated 75% weed control and were more economical than treatment 3.


Treatment 1
- Gramoxone
Treatment 2
- Gramoxone, Princep
Treatment 3- Gramoxone,
Princep, Surflan
Treatment 4- Gramoxone,
Chateau
Treatment 5
- Gramoxone, Alion
Treatment 6
- Gramoxone, Princep (1st wire)
Treatment 7
- Gramoxone, Princep (2nd wire)

Disease/Fungicide Demonstration on Commercial Blackberries

Cooperator: Ritter Farm
Specialist: Aaron Cato

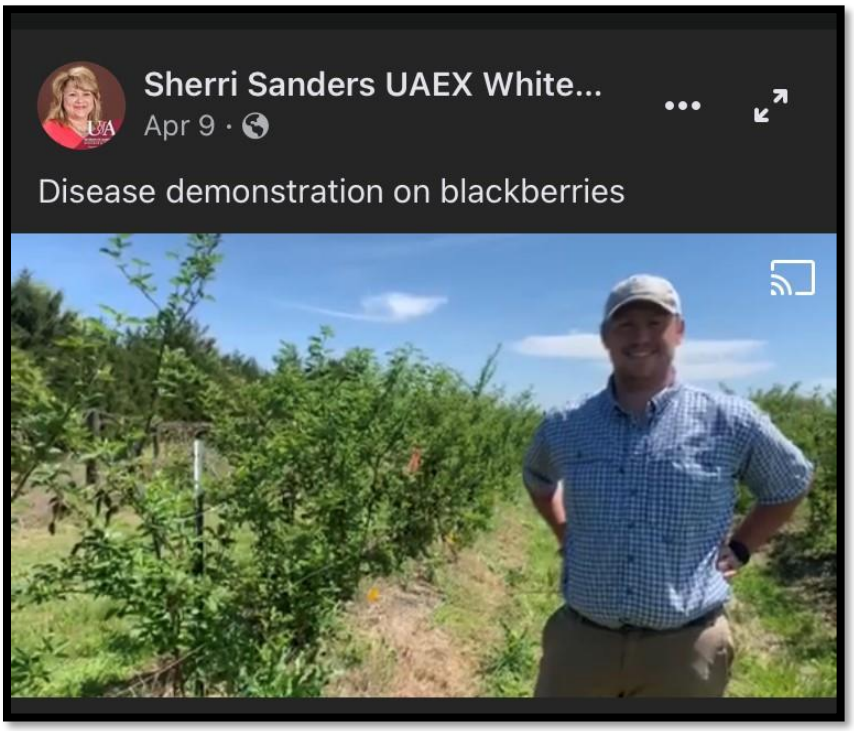
A disease demonstration was conducted on April 9 to assist a grower to develop a comprehensive plan and to assist with more efficient products and/or timing of sprays to eradicate or suppress anthracnose in commercial blackberries.

Treatments were:
Treatment 1 was not sprayed - UTC
Treatment 2 Captan 80 WDG 2.5 lb/A - 10.9g per gallon (32.7g for 3 gallon)
Treatment 3 Pristine 23 oz/A - 6.2g per gallon (18.6g for 3 gallon)

We sprayed every 14 days from 4/9 through 6/4.

We abandoned the project once the cooperator told us they planned to pull out the plants. These treatments were targeting the new primocanes that were growing. All had already received a dormant lime sulfur spray and one application of Pristine so we didn't expect to see a difference in this year's crop.

Videos and posts were shared on social media, and the White County Horticulture newsletter reaching over 8300 contacts.



Blackberry Demonstration – Primocane and Traditional Blackberries (multiyear project)

Cooperator: Pioneer Village – City of Searcy (Master Gardener project)

The University of Arkansas Fruit breeding program is responsible for releasing blackberry varieties that are

important to blackberry production across the United States and world.

The blackberries demonstrations were planted in 2017 with Osage, Ouachita and Prime-Ark® Traveler being the three main varieties used in our location. Tissue culture plug plants were used for the Osage, Ouachita and Prime-Ark® Traveler plantings. A standard fertility and pest management program was utilized and plants were allowed to establish over the 2018 season. During the 2019-2020 seasons the berries were harvested over several weeks and recorded the average weight of individual berries and recorded their observations.

The varieties included in this study vary in their fruiting characteristics and in ripening time, which allows for the possible extension of the blackberry season, especially with the combination of floricane (F) and primocane (P) fruiting varieties.

The plants have been fertilized, monitored for diseases and insects, and pruned according to the U of A recommendations. This demo has been promoted on Facebook, Twitter and in horticulture and Master Gardener newsletters, reaching 10,000+ people not including the visitors to Pioneer Village each year. The White County Master Gardener volunteers have assisted with maintenance and harvest each year. All the varieties used in the demonstrations have previously been tested extensively at the University of Arkansas Fruit Research Station in Clarksville, AR. Most of the average berry weights for the varieties tested reached the estimated average for that variety. Prime-Ark® Traveler (floricane) had the highest average berry weight followed by Ouachita and Osage.

Overall, Arkansas released varieties have shown to do very well in the state and to be adaptable to a wide range of areas. The importance of plant health for berry size and flavor were also observed. For more information on growing blackberries: https://www.uaex.edu/farm-ranch/crops-commercial-horticulture/horticulture/commercial-fruit-production/blackberry-school.aspx

Prohexadione Calcium on Blackberries Demonstration

Cooperator: Ritter Farms and Fruit Station in Clarksville
Assistance provided by: Amanda McWhirt, Blair Griffin, Jill Allen and followed North Carolina State's protocol

During the week of March 15th, we were able to put out two Prohexadione Calcium demos; one in Clarksville at the Fruit Station and one in White county at Ritter Farm.

This research has exciting potential for blackberry growers in Arkansas. Why is it exciting? Two years ago, while on an in-service training trip, I learned about this research that North Carolina State University was beginning in commercially grown blackberries. Under the direction of Gina Fernandez, NCSU was using Prohexadione calcium in a small plot of blackberries. Prohexadione calcium is a foliar applied plant regulator which reduces vegetative growth by inhibiting the synthesis of gibberellin, a naturally occurring plant hormone. Specifically, it decreases the length of shoot internodes.

In apples and pears, it decreases the need for pruning, allows more light to penetrate the tree canopy increasing fruit coloration, and, due to increased air circulation, decreases the incidence of fire blight, a bacterial disease of apples and pears. We hope to determine effects and interactions of P-Ca application timing and rate on floricane blackberry cane height.

Why is this a big deal? Labor costs can be decreased dramatically if we can demonstrate that this product is effective in the "tipping and pruning" management of canes. With less tipping and pruning we think it should lessen the disease incidence as well. To read more about the project and to see Gina's presentation at the Southeast Regional Fruit and Vegetable Conference in Savannah GA from January 10, 2019: https://bit.ly/3aESpzU

We are simply piggy backing onto NCSU's research to see if we get similar results here in Arkansas. It's our hope that our findings will be useful to them as well.

Our planned treatments:

1) Commercial control (includes tipping and standard management practices).
2) Three applications of 3 oz. P-Ca + water conditioner + surfactant starting at 1 to 3" floricane shoot length.
3) Three applications of 3 oz. P-Ca + water conditioner + surfactant starting 21 days after 1 to 3" floricane shoot length.
4) Three applications of 9 oz. P-Ca + water conditioner + surfactant starting at 1 to 3" floricane shoot length.

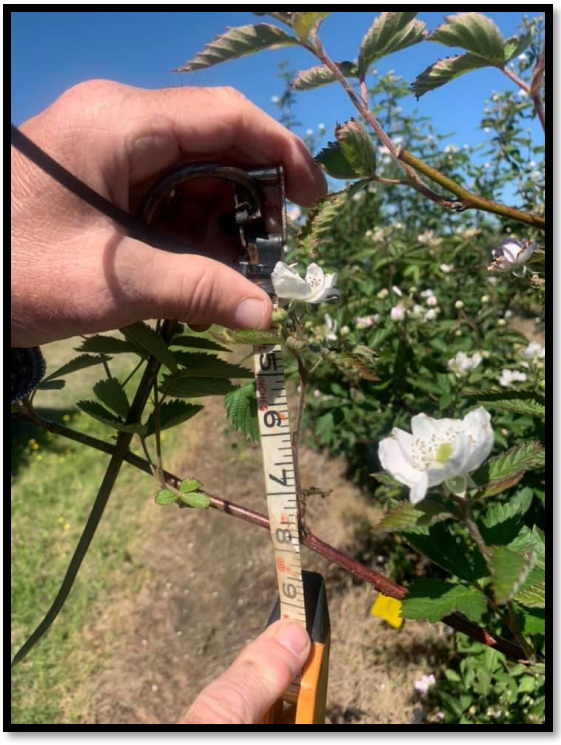
5) Three applications of 9 oz. P-Ca + water conditioner + surfactant starting 21 days after 1 to 3” floricane shoot length.

Three applications are to be made on 21 day intervals during a 6 to 8 hour period without rain. Applications are made to drip (minor runoff from canopy) to the entire canopy (both floricanes and primocanes) and applied on both sides of the row.

Weekly berry counts (Marketable yield, Cull fruit yield in grams and average 10 berry weight) between treatments were taken by Jill Allen, a seasonal employee in White county and by staff members at the fruit station. Sanders took all primocane length measurements in plots at Ritter Farm.

Harvest and primocane measurement data have been analyzed and we plan to continue our research at both locations. For detailed data results, please contact Sherri Sanders at ssanders@uada.edu or Amanda McWhirt at amcwhirt@uada.edu .

Videos and posts were shared on social media, the White County Horticulture newsletter, and the Arkansas Blackberry Growers newsletter, reaching over 48,000 contacts.



Pasture Weed Control for Livestock Peer to Peer Training

Cooperator: Ouida Cossey
Assistance: Blair Griffin

A pasture weed control demonstration to use as a training for livestock agents was conducted on February 20, 2020.

Plot size: 10 x 50 5 ft alley

Treatment 1:	2,4 D	1 qt
Treatment 2:	Metsulfuron	0.3 oz
Treatment 3:	Grazon PD	1 qt
Treatment 4:	GrazonNext	1 qt
Treatment 5:	Weedmaster	1 qt
Treatment 6:	Duracor	16 oz

Note: 45 deg rain within 1 hour
This was featured on social media and reached a total on 1124 contacts. Due to Covid this training was cancelled and therefore not rated.

Tomato Demonstration

Cooperator: Shauna Ritchie
Specialist assistance: Dr. Amanda McWhirt and Hank Chaney

Along with agents statewide, I conducted a tomato demonstration in White County. I was one of five model sites for Arkansas. The purpose of the tomato demonstration was to compare five different varieties. Soil samples were taken, and the area was amended according to our U of A recommendations. The demo was planted on April 28, 2020 with 6 plants each of Celebrity, Red Defender, Mountain Magic, Mountain Spring and Phoenix. The cooperator experienced some setbacks and the plot at her residence was abandoned. However, Brian Haller and I ended up with some extra plants and used them at our homes. Social media posts were shared and 8934 contacts were made.

Tri-County Pecan Orchard

Agents: Jan Yingling, Sherri Sanders, Amy Tallent, Brent Griffin, Keith Perkins, Max Coffin

Cooperator: Johnny & Jeffery Reidhar
Purpose of Demonstration: To demonstrate how to grow pecans while using best management practices and University of Arkansas recommendations for homeowners

Type/Design of Demonstration: 24 trees were selected out of a mature pecan orchard

Materials and Methods:
Demo Size: 24 trees
Variety: Stewart & Desirable
Planting date: Mature Orchard (20 years old)
Harvest date: November 20th, 2020

Discussion: The tri-county pecan orchard demo was a collaborative effort between Prairie, Lonoke and White county and born from a basic pecan growers informational meeting the group conducted. The pecan orchard was soil sampled on April 9th and recommendations were made on overall fertilization. An initial fertilizer application of 350 lbs. of 30-46-60-1-12 was made. The demo was marked and trees to be included in the demo were selected.

The cooperators purchased an Agri Mist 1000 that was then calibrated by Jason Davis and the county agent team. Spray cards were strategically placed in the canopy of the mature trees to ensure proper coverage using the new equipment. The initial pre-pollination fungicide spray was made on April 18th. Quilt Xcel was applied at a rate of 17.5 oz/acre. Recommendations were made to help control weeds throughout the orchard with an application of Select and Roundup. A 14-day fungicide spray schedule was created for the producers that alternated between two modes of action to prevent pecan scab. The first cover fungicide spray was applied on May 4th. An application of Super Tin 4L at 7 oz./acre was made. The orchard was mowed as needed to help with sanitation of fallen branches and plant material. On May 29th, the second cover fungicide spray was applied. An application of Quilt Xcel at a rate of 17.5 oz./acre was applied.

On June 12th, the county agent team deployed *6 Dead Inn Yellow Stink Bug traps, 3 Wire Circle Pecan Weevil traps, 6 Dead Inn Black Pyramid Pecan Weevil traps, 4 Pecan Nut Casebearer Hanging Traps, and 3 Clear Sticky traps in the orchard*. These traps were monitored weekly with the appropriate lures and pheromones being changed out as necessary. On June 19th, the third cover fungicide spray of Quilt Xcel at 17.5 oz./acre was applied. Pecan foliar samples were taken on July 13th and sent to the Agricultural Diagnostic Lab in Fayetteville. No additional fertilizer recommendations were made for the orchard. Black aphids were found at treatment levels on July 17th and an application of Mustang Maxx at 4 oz./acre was made to help control the population. The orchard was prepped for harvest on October 13th by mowing fallen limbs and pulling of the insect traps. Harvested started on November 20th and continued to December 5th. The orchard did not produce a decent nut crop this year due to unforeseen circumstances. The demo will be repeated with an additional location added.