

**Proposal Category:** Research

**Title:** Assessing Pest Management Strategies in Blackberries Produced on a Rotating Cross Arm Trellis.

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**Abstract**

Cultural controls are often the cornerstone of effective and diversified pest management plans. Successful blackberry production systems rely on cultural controls such as site preparation, pruning techniques, and trellising systems to help manage diseases and emerging pests such as spotted-wing drosophila, that often have limited pesticide options. The RCA trellis system has exhibited the potential to impact pest management as the plant canopy is modified to consist of a flat plane of canes, possibly allowing for increased spray penetration, while also creating a less ideal environment for both pest and diseases. We proposed to investigate the spray volume (gallons per acre or GPA) necessary to achieve acceptable coverage in an RCA production system, as well as observe pest complex differences within treatments and in RCA vs. V-trellis systems overall. Ouachita blackberries following a split-plot design with the trellis type (RCA vs. V-trellis) as the split plot factors and spray volume (GPA) as sub plot factors within each split plot were established at the University of Arkansas Southwest Research and Extension Center in Hope, AR on 5/25/2021. Spray trials are planned to begin in the Spring of 2022 and more trials are planned throughout 2022 and 2023 when mature growth begins to fill out the trellis structures.

## **Introduction**

When considering pest control in perennial small fruits, such as blackberry, cultural controls are the cornerstone of effective pest management plans. With emerging pests such as spotted wing drosophila, we've seen an increased reliance on cultural control techniques to manage pests in the Southeast with limited pesticide options, especially in organic plantings. The RCA trellis system has exhibited the potential to impact pest management as the plant canopy is modified to consist of a flat plane of canes. This modification allows for increased air movement and decreased density, especially when compared to the commonly used V-Trellis system. Recent studies have indicated that reductions in canopy density may negatively impact populations of key pests of blackberries. Spotted wing drosophila (SWD) is known to seek shaded areas in the heat of the day within the canopy of blackberry plants (Diepenbrock and Burrack 2017). Although these densely shaded areas are commonplace in V-Trellis systems, the single plane of canes in the RCA system should be a much less favorable environment.

Current research by Amanda McWhirt has indicated that lower rates of % fruit infestation are found in RCA blackberries vs. those fruit grown on V-trellises under similar management programs, but the reason for this decrease is unclear. It's likely this is in part due to a decrease in preferred habitat as mentioned above, but there are other factors in play. The RCA system consists of a flat plane of floricanes that are separated from primocanes, which likely increases the efficiency of spray volume traveling through the blackberry canopy. An increase in spray volume efficiency could lead to better spray coverage on berries and reduce the incidence of SWD infestations. This also begs the question of what amount of spray volume, or gallons per acre (GPA), is necessary when using an RCA system. If the necessary spray volume could be reduced for SWD and other foliar pesticide sprays, farmers could save valuable time and money. Some current adopters of the RCA system have already decreased their spray volume and increased spray time efficiency by angling two RCA rows towards each other and spraying them in 1 pass from each side. However, no data on the effectiveness of this strategy currently exists, and currently no research has studied the impact of reduced sprayer volume in RCA systems vs. traditional trellising systems.

We proposed to investigate the spray volume (GPA) necessary to achieve acceptable coverage in an RCA production system, as well as observe pest complex differences within treatments and in RCA vs. V-trellis systems overall.

### **Objectives:**

1. To investigate the feasibility of obtaining adequate spray coverage using reduced spray volume (GPA) for pesticides on blackberries grown on the rotating cross arm (RCA) trellis system using water-sensitive spray cards to elucidate the potential for lower input pest management systems in blackberries grown on the RCA.

2. To further investigate differences in spotted wing drosophila (SWD) populations and % SWD fruit infestation in blackberry plants produced on RCA trellis systems compared to traditional V-trellis systems when using varying spray volumes.
3. To observe insect and disease pest complex differences in RCA and V-trellis systems with pesticide treatments made at different spray volumes.

## Materials and Methods

Blackberry plantings of the cultivar Ouachita were established at the University of Arkansas Southwest Research and Extension Center in Hope, AR on 5/25/2021 (Figure 1). Plantings followed a split-plot design with the trellis type (RCA vs. V-trellis) as the split plot factors and spray volume (GPA) as sub plot factors within each split plot (Figure 2). Plots consisted of 3 plants with a 2-plant buffer between each plot. Plant spacing was 3ft on the RCA trellis and 2 ft on the V-Trellis. This split plot design will allow for baseline differences in pest management to be observed between the two trellis types, as well as the interaction between trellis type and spray volume.

Split-Plot Factor	Sub-Plot Treatments
V-Trellis	10 GPA
	25 GPA
	50 GPA
	75 GPA
RCA Trellis	10 GPA
	25 GPA
	50 GPA
	75 GPA

## Current Results Future Plans

Establishment and growth of the blackberry plants necessary for this trial was achieved in 2021. Initial Fall spray trials in the early establishment year were delayed because plants couldn't be trellised until the late Fall. This was due to a lack of labor at the Hope experiment station. Plants are currently being trellised and observation of initial differences will begin in the Spring of 2022. Additionally, enough growth was achieved on plants to begin spray card trials and observe initial differences with spotted wing drosophila infestations in the Spring of 2022. Ultimately, growth that occurs on primocanes in 2022 will allow for the full trellis effect and the full implementation of this trial through the Summer of 2022 and Spring of 2023.

## References Cited

L. M. Diepenbrock & H. J. Burrack. 2017. Variation of within-crop microhabitat use by *Drosophila suzukii* (Diptera: Drosophilidae) in blackberry. *J. Appl. Entomol.* 141: 1-7.



**Figure 1. Ouachita Blackberries planted on 5/25/2021 in Hope, AR.**



**Figure 2. Alternating V-trellis and RCA trellis rows of 1<sup>st</sup> year Ouachita Blackberries on 10/21/2021.**