

Broad Mite Infesting Blackberry Earlier than Normal

Broad mite infestations have been found early in Arkansas and the time is now to get out and scout your fields!

By Aaron Cato

Broad mite is a serious issue for many Arkansas blackberry growers usually beginning around mid-late July, and this year we observed impactful infestations in field-grown blackberry as early as late June. We've found populations at 10-50x threshold throughout July in multiple locations, and growers are making miticide applications likely 2 weeks earlier than normal.

Broad mite being early should be a worrying sign for all blackberry growers in the Midsouth region. First, when pests like broad mite blow up early it could mean that infestations may be more widespread than normal. Blackberry fields will still be at risk for infestations through September meaning there is a much wider window for infestations to occur and ramp-up in places we don't normally see them hit threshold. Additionally, some growers often need two miticide applications, with the first being in Mid-July then another in late August. It's possible that some fields could warrant additional miticide applications. What we do know is that agents and growers need to be on the lookout for this pest in plantings across the state. Outlined below is information about the biology of broad mite, how to monitor it in your plantings, and what you can do to control it, which should lead to successful management of this pest.



Picture 1. Broad mite damage observed on blackberry in 2023 in Northeast Arkansas. Broad mite damage can easily be identified by inward rolling of leaves, leaving a spade-like appearance, along with shortened internodes.

What is Broad Mite?

Broad mite, *Polyphagotarsonemus latus* (Banks), is a tarsonemid mite that feeds on new leaf material, flowers, and fruit. Unlike other mite pest species, such as the two-spotted spider mite (tetranychid mite), broad mite is microscopic (0.1-0.2 mm) (**Picture 2**) and generally goes unnoticed until injury on new growth and reproductive structures is observed. Broad mite is distributed throughout much of the world and occurs as a pest mainly in tropical or subtropical regions such as the Southeastern United States. Broad mite has a large host-range and is most notably a pest in greenhouse production of food and ornamental crops.



Picture 2 – Ambered-colored broad mite adult observed using a dissecting microscope.

Broad Mite in Blackberry

Broad mite was first reported as a pest of blackberry in the United States in 2007 and was further realized as a serious threat to commercial blackberry production in 2014 (Vincent et al. 2010; Johnson & Garcia 2015). Commercial plantings in Northeast Arkansas exhibited large levels of estimated yield loss (\$15,000 to \$20,000), and infestations were observed in many states across the Southeastern region. Broad mite was initially found to infest greenhouse propagation of blackberry plants, and later infestations of established plants were observed during the early summer months. Over the last 5 years, economically significant populations of broad mite have been observed on multiple blackberry plantings in Arkansas each year. Severity can differ from year to year, but it appears this pest is here to stay and may be exacerbated by climate change.

Broad mite is a subtropical pest species that does not emerge until the summer in climates with cold winters. We usually begin to see a few mites in late-May, and we don't generally observe injury or significant infestations until mid-late July. This varies from year-to-year and sometimes we don't see any injury until August. A good rule of thumb is to begin scouting primocanes when harvest starts on floricanes, and don't let up until it starts to cool down in the fall.

Broad Mite Injury in Blackberry

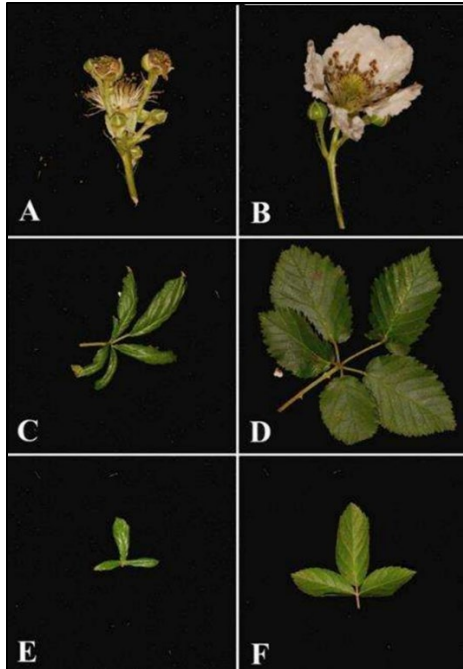
Broad mite feeding on blackberry is often reminiscent of injury from auxin herbicides and stunts plants in a similar manner. Malformation of plants is due to the toxic nature of the mite's saliva. Feeding leads to stiff, curled leaves with cupped margins, a decrease in internode length, and potentially leaf death and tip dieback in serious infestations (**Picture 3, Picture 4**). Broad mite will also feed on and damage the fruit and flowers of primocane-fruiting cultivars (**Picture 5**). Significant yield loss has been observed to primocane crops through a direct effect on developing flowers and fruit. A rating scale has been developed by Jared Linn (Graduate Student - UARK Hort IPM) that helps to identify broad mite damage and judge the potential impact to next years' floricanes (**Picture 6**). We expect yield loss when canes reach a rating of 4 and especially 5, but excessive stunting could ultimately lead to yield loss depending on when damage is first observed and whether this stunting ultimately leads to unacceptable canopy-fill.



Picture 3 – Early signs of broad mite damage to primocanes terminals. Injury is characterized by the bronzed coloration and upturned nature of new leaves, along with twisted and cupped leaves on older nodes.



Picture 4 – Severe injury from broad mite infestations. This primocane was severely stunted, leaves began to be necrotic, and the tip was completely killed back.



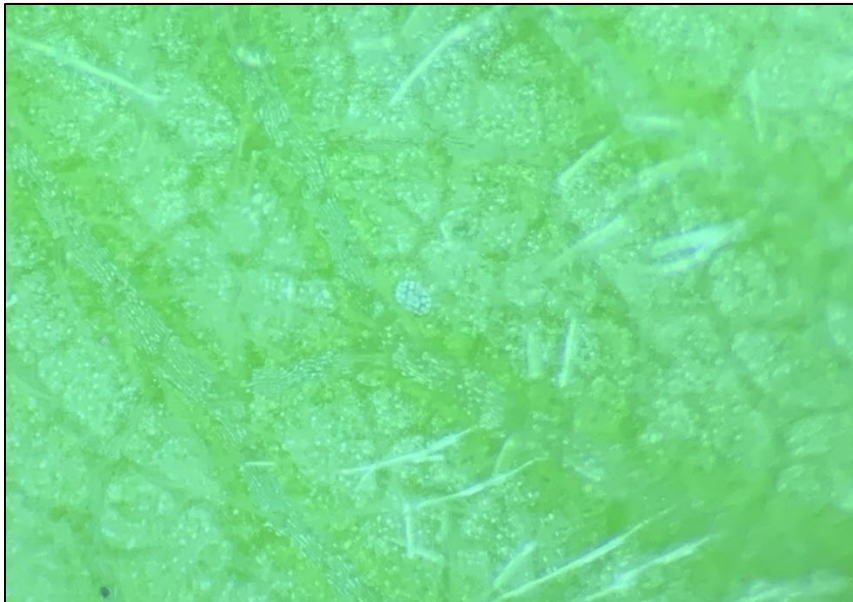
Picture 5 – Broad mite damaged (left) and normal (right) blackberry flowers and leaves. Photo credit Vincent et al. 2010.



Picture 6 – 1-5 Rating scale for broad mite damage. A rating of 1 has no shortened internodes or leaf cupping. A 2 rating indicates leaf bronzing, reduced internode length and the beginning of leaf cupping or upturned leaves. A rating of “3” exhibits excessive leaf cupping and a rating of 4 indicates that leaves are beginning to become necrotic. A rating of 5 indicates tip-dieback and excessive necrosis of new leaves. Photos by Ryan Keiffer, Jared Linn, and Aaron Cato.

Broad Mite Management in Blackberry

Scouting is key to broad mite management. Any miticide that is applied before broad mite is present is likely to have no positive effect and could potentially lead to increased issues in the future. It's likely that pyrethroids or other broad-spectrum insecticides used to control insect pests such as spotted-wing drosophila promote broad mite issues, as they kill predatory mites. Growers should scout for signs of injury in their plantings throughout the year, especially once harvest begins on the floricanes crop. Damage often emerges on field edges before it spreads throughout plantings. It presents first as tightening of the internode and leaves will begin to roll or cup before it begins to look serious (**Picture 6**). Once any suspected broad mite injury is observed, pull 10 unfurling leaflets (third node from the top, leaves should be just starting to lay flat) from surrounding primocanes. Ambered-colored adult broad mites can be seen at about 30x-60x magnification, which is usually available at your local extension office. Also be on the lookout for their distinctly polka-dotted eggs, which indicates that it is time to spray (**Picture 7**).



Picture 7 – Broad mite egg on the underside of a blackberry leaflet as viewed through a dissecting microscope. These eggs are distinctly polka-dotted and a sign of a rapidly increasing broad mite infestation.

Broad mite numbers often build very rapidly and work by Dr. Donn Johnson has indicated that reaching between 1-5 mites per leaflet is the sweet spot for control (Johnson and Garcia 2015).

Once mites exceed an average of 10 per leaflet, damage is usually widespread and populations can be difficult to effectively manage. Finding eggs in samples along with adult mites is also a good indication that it is time to apply a miticide for control.

Ultimately the largest issue with using broad mite numbers to indicate the need for a miticide is the microscopic nature of this pest. Our observations and current work from Jared Linn indicate that our visual rating scale (**Picture 6**) of plant injury may be used to make miticide applications. Broad mite generally hits threshold when canes can be observed at an injury rating of 2-3. When any canes can be found at an injury rating of 4-5, especially interspersed with lower levels of broad mite injury, populations are usually raging and likely to be 2-3 times threshold. We recommend sending in leaves for ID if small amounts of suspected damage are observed, and miticide applications are necessary if damage (rating of 2-3, **picture 6**) is widespread. After applying any miticide for broad mite, continue scouting to assure effectiveness and for the potential of new infestations. Farms in Arkansas that have major broad mite issues often necessitate two applications a year, especially in years when the first infestations begin early.

Broad Mite Control Options

Currently there are many options to control broad mite, but only a few that can safely be used in the heat of the summer (above 80-90°F). Products such as Mpede (potassium salts of fatty acids), Microthiol (sulfur), JMS Stylet Oil (paraffinic oil), or Neem Oil all offered sufficient suppression of broad mite (Lefors et al 2017). These products can be risky to use in the heat of the summer and can damage blackberry plants if applied when it is too hot. It is important to note that these products were not always found to be effective in efficacy trials (Johnson and Garcia 2015).

Agri-Mek and Magister continue to provide excellent control with great residual, but a 7-day preharvest interval (PHI) hampers their usefulness (**Figures 1-4**). Portal (1-day PHI) is a good option for growers that are either looking to finish out floricanes harvest or need to protect developing fruit while harvesting primocane fruiting varieties. Results from our trials indicate that Portal will knock back damaging broad mite populations and limit the amount of plant injury that is observed, while offering a 1-day preharvest interval. However, any grower that uses Portal should continue to scout for damage and mites. A second portal application of Portal should only be considered 14 days (label restriction) after the first if harvest is ongoing, and either Agri-Mek or Magister should be prioritized for a second application to help reduce the likelihood of resistance.

Effective Management Plan for Broad Mite

Broad mite has not been found to affect the floricanes crop, but it can start to feed on primocane growth prior to the end of floricanes harvest. Control efforts generally need to be focused on limiting damage to this year's primocanes, which could translate to yield loss in primocane fruiting cultivars and lowered yield potential in next year's floricanes production. Scout for leaf injury and confirm that it is broad mite damage by sending in samples to your

local extension service. If you are observing damage and there is more than 1 broad mite per leaflet across a significant portion of a plant, Agri-Mek + NIS is a good first option. If you are still harvesting late varieties such as Navaho or Von, or have primocane fruiterers, consider using Portal. Save Magister to use as a rotation tool if necessary. You will need thorough coverage (60-100 GPA is preferable) to get acceptable control, as broad mite is often feeding deep inside terminal leaf material.

Give me a call at 479-249-7352 if you have any questions.

Aaron Cato

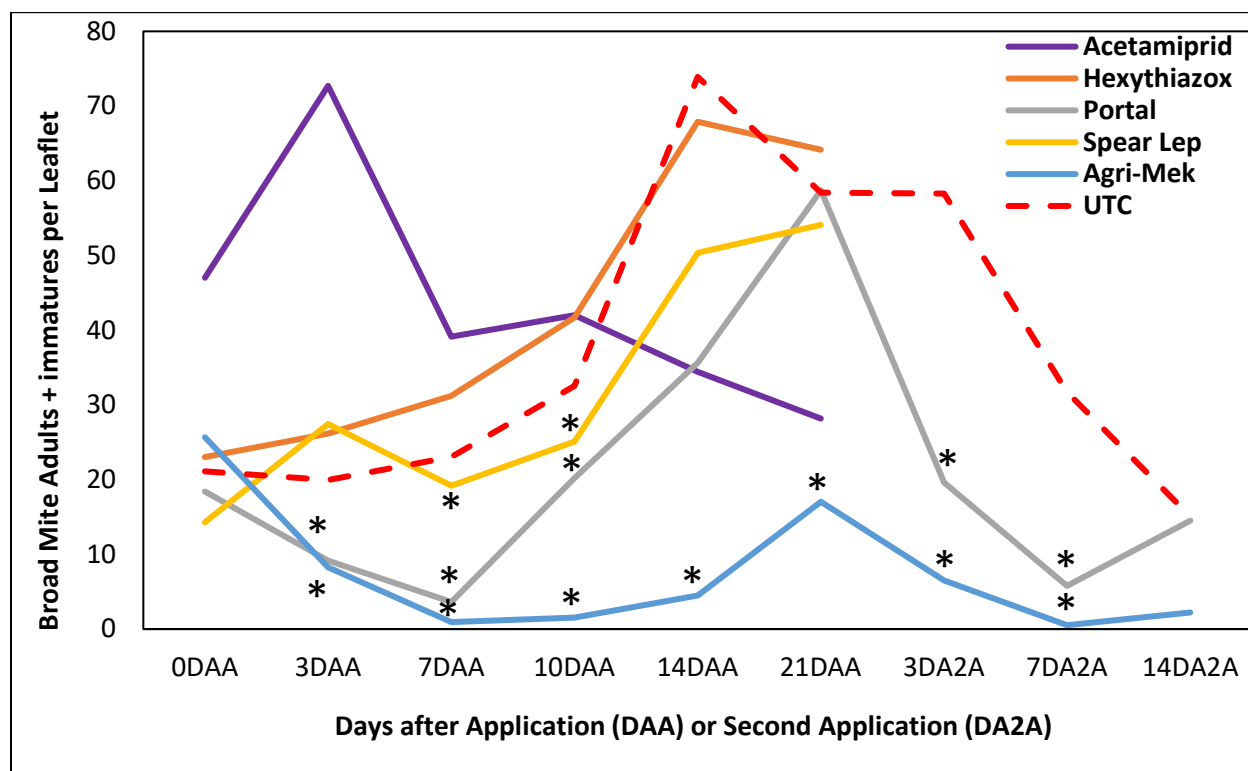


Figure 1. Broad mite adults and immatures observed per leaflet in Trial 1 across 5 miticide treatments in blackberry compared to an untreated check (UTC) observed 0-21 days after the first miticide application (DAA) and 3-7 days after the second miticide application (DA2A) on a grower field in White County, AR. *indicates significant difference from Untreated Check.

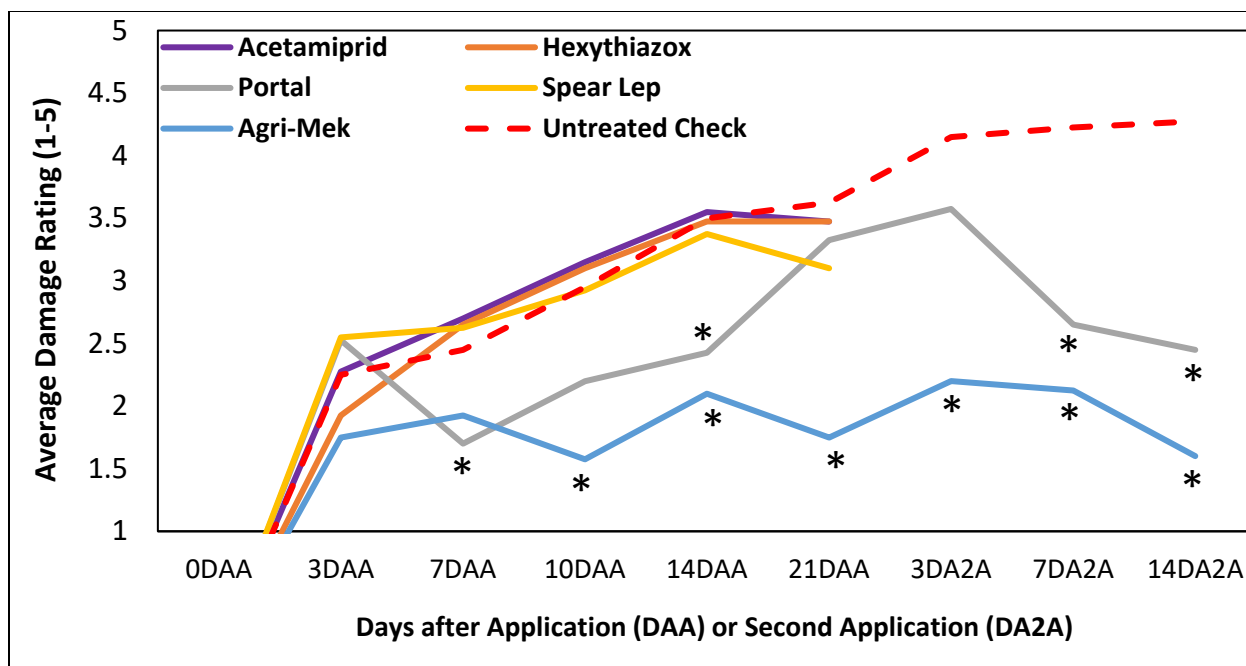


Figure 2. Broad mite damage ratings (1-5) in Trial 1 across 5 miticide treatments compared to an untreated check observed 0-21 days after the first miticide application (DAA) and 3-7 days after the second miticide application (DA2A) on a grower field in White County, AR.. *indicates significant difference from Untreated Check.

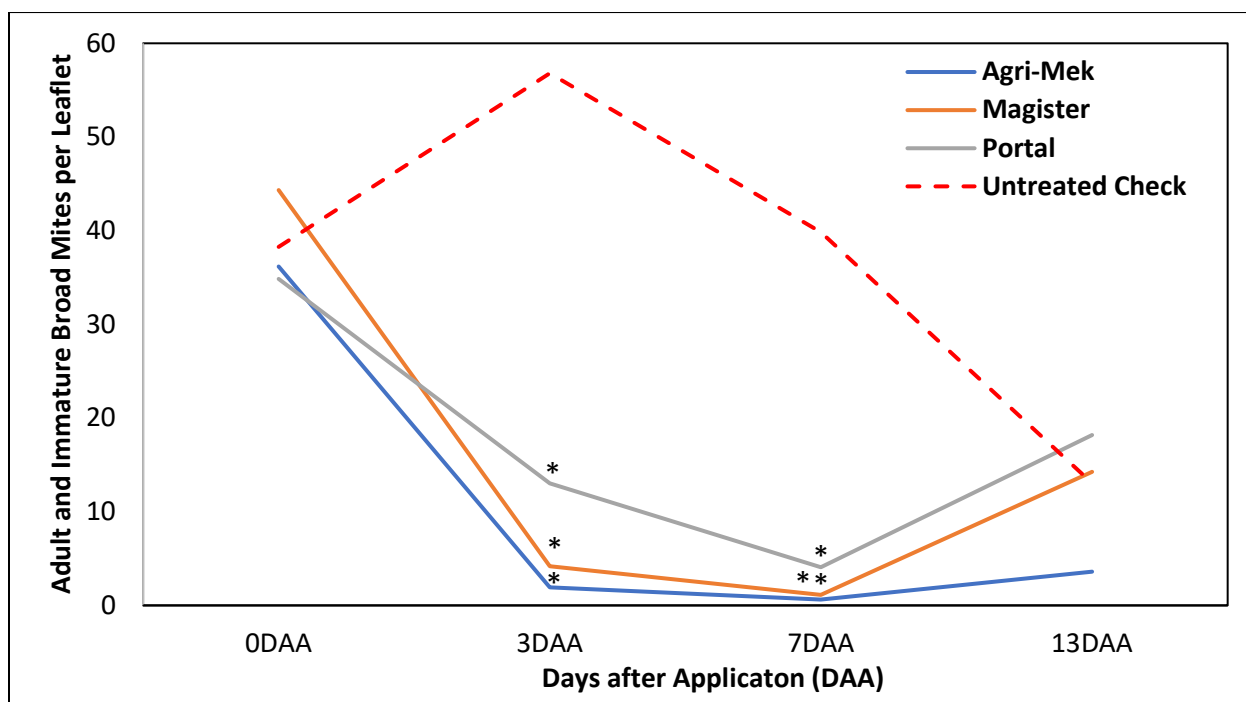


Figure 3. Broad mite adult and immatures observed per leaflet in Trial 2 across 3 miticide treatments in Blackberry compared to an untreated check observed 0-13 days after application (DAA) on a grower field in White County. *indicates significant difference from Untreated Check.

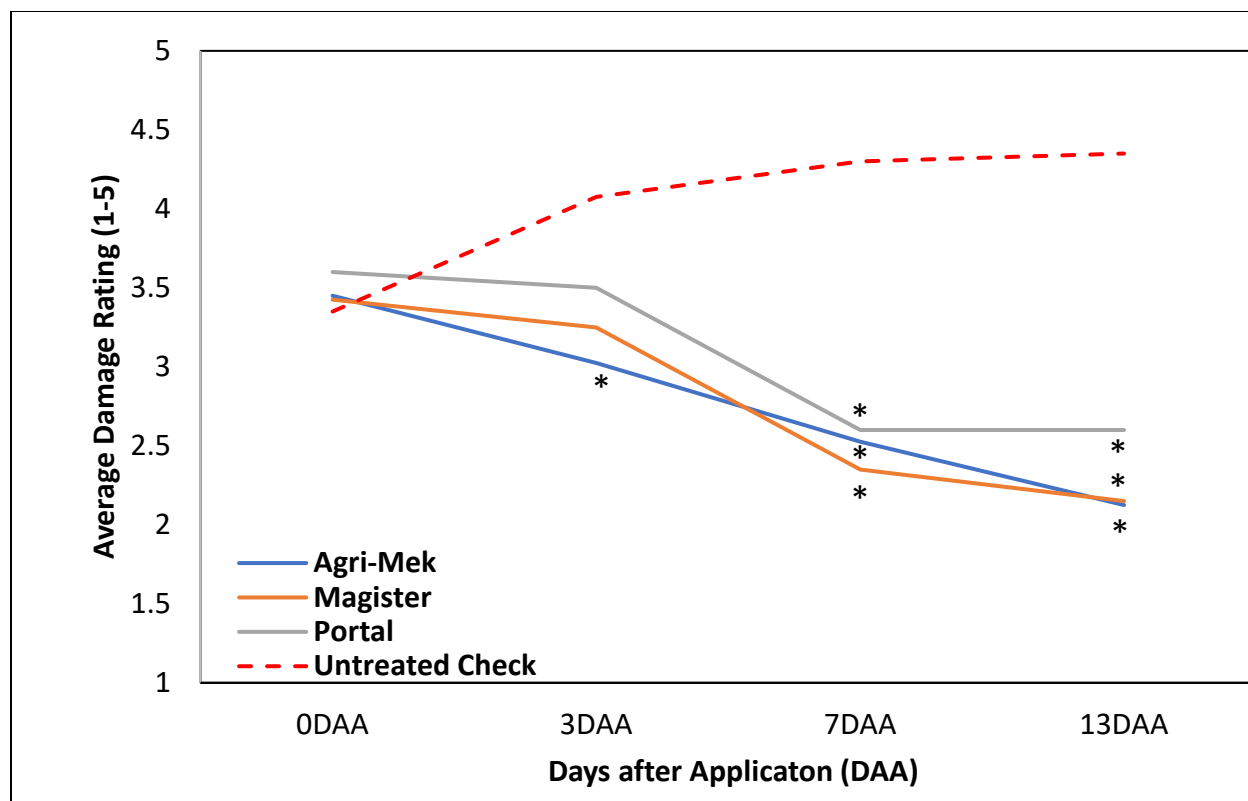


Figure 4. Broad mite damage ratings (1-5) in Trial 2 in blackberry across 3 miticide treatments compared to an untreated check observed 0-13 days after application (DAA). *indicates significant difference from Untreated Check.

References

- Johnson & Garcia. (2015). Broad mite biology and management on blackberry. SRSFC Report. <https://smallfruits.org/files/2019/07/2015-06.pdf>.
- LeFors, J. A., D. T. Johnson, and T. Woodruff. 2017. Acaricidal Control of Broad Mites in Blackberry, 2016. Arthropod Management Tests, 2017: 1-2.
- Vincent, C. I., M. García, D. T. Johnson, and C. R. Rom. 2010. Broad Mite on Primocane-fruiting Blackberry in Organic Production in Arkansas. Hort. Tech. 20: 718-723.