

Managing Agave Mites: What We Know So Far

Eric Middleton PhD, IPM Advisor, University of California Statewide IPM Program and Cooperative Extension, San Diego, Orange, and Los Angeles Counties

Gerardo Spinelli, Production Horticulture Advisor, University of California Cooperative Extension, San Diego County.

Agave mites are a pest of ornamental agave that are increasingly concerning commercial growers and homeowners alike. Colloquially known as “grease mites”, agave mites are a type of eriophyoid mite in the genus *Oziella*. Adults are around 1/3mm long and resemble translucent whitish worms (Fig. 1). Despite their small size, agave mite feeding can cause significant cosmetic damage to ornamental agave in both nurseries and landscapes.

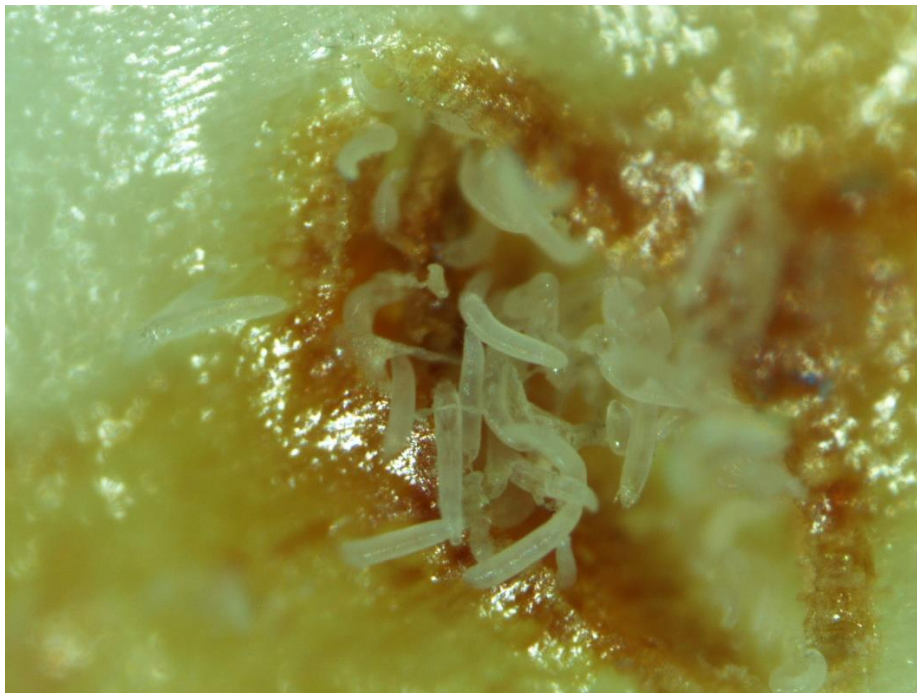


Figure. 1. Group of agave mites (*Oziella* sp.). Credit: Eric Middleton, UC IPM.

Unfortunately, very little is known about these mites or how best to manage them. While studies have been conducted on miticides for use against the related aloe mite (see Villavicencio et al. in the references) this information does not currently exist for agave mite. To properly manage agave mites and come up with an effective IPM plan, we are currently studying various control methods for agave mite, as well as basic information about their biology and lifecycle.

Below are the preliminary results of our research combined with our current best management guidelines based on the limited published information that exists.

Hosts

The complete host range of agave mites is unknown, but they appear to be able to infest most agave species. In nurseries around San Diego, we have seen them primarily on Blue Glow agave (*Agave attenuata* x *Agave ocahui*) and *Agave parryi* var. *truncata*. They have also been found on *Agave guadalajarana*, *A. isthmensis*, *A. macroacantha*, *A. murpheyi*, *A. palmeri*, *A. parrasana*, *A. potatorum*, *A. potrerana*, *A. shawii*, and *A. titanota*.

Scouting, Symptoms, and Spread

You won't see agave mites in the field. In addition to their small size, agave mites are hidden out of sight at the base of leaves and within the core of their host plants. The only way to see agave mites is to pull the agave apart and examine the leaves under high magnification, preferably using a microscope as opposed to a hand lens. Agave mites are very difficult to see even under a scope as they blend in with the whitish base of the leaf that they feed on, so exercise caution if you are trying to determine if mites are present or not. When we dissected symptomatic agave plants in the lab, the majority of mites were found on the concave side of leaves (facing the core), and the deeper in the core we got, the more mites we found per leaf.

Scouting for agave mite involves looking for plants that are displaying symptoms instead of finding the mites themselves. The classic symptom of an agave mite infestation is greasy streaks. Often, it looks like someone dipped their thumb in grease and pushed it onto the inside surface of the leaf (Fig. 2). Leaves can also turn yellowish and develop lesions if the feeding damage is more severe. Once symptoms develop, commercially grown agave often become unsalable due to their appearance. In bad infestations, the core of the agave becomes distorted and begins to collapse (Fig. 3). While the damage these mites cause is mostly cosmetic, heavy infestations will stunt growth and can even kill agave in some instances.



Figure 2. Characteristic “greasy” streak on a Blue Glow agave leaf, caused by agave mite feeding. Credit: Eric Middleton, UC IPM.

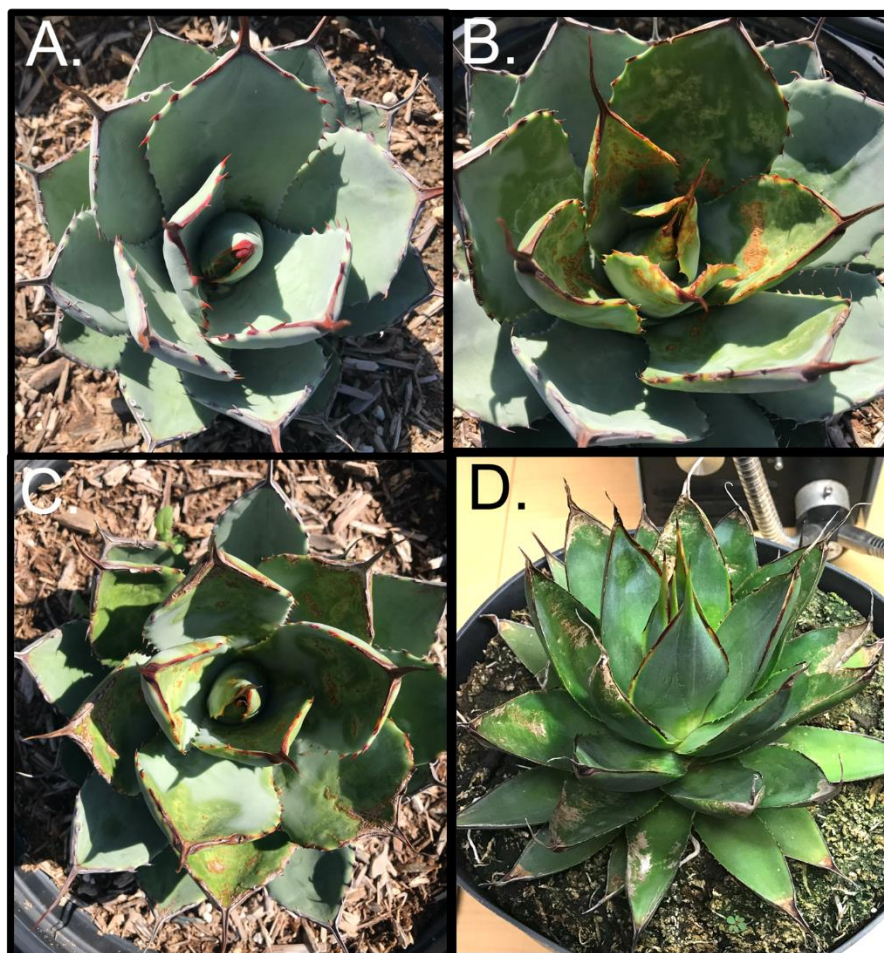


Figure 3. A. Healthy Parry's agave; B. Parry's agave with symptoms on core and inner leaves; C. Parry's agave with symptoms on most leaves; D. Blue Glow agave with symptoms on most leaves. Credit: Eric Middleton, UC IPM.

But how long does it take after mites infest a plant for symptoms to appear? Considering agave are slow growing plants, agave mites are probably present for a long time before the plant grows out and symptoms first become visible. To more directly test this, we deliberately infested clean plants with agave mites and monitored them over the course of several months. We found symptoms appeared in young Blue Glow agave approximately 3 months after infestation, and in Parry's agave around 5 months after infestation.

Like other eriophyoid mites, agave mites are thought to spread by being carried on the wind, making infestations patchy and hard to predict ahead of time. As an example, we put 125 clean agaves in the center of a hoophouse where symptomatic agaves were frequently present, and monitored them for symptoms for 7 months. None of the clean plants developed symptoms and no mites were found on any of them, despite new symptomatic agave appearing frequently elsewhere throughout the hoophouse for the duration of the experiment. Even in cases where there is high pest pressure, agave mite infestations are unpredictable.

Biological Control

Predatory *Amblyseius* mites could be useful tools to prevent agave mite infestations. We tested three different commercially available predator mites (*Amblyseius andersoni*, *A. californicus*, and *A. swirskii*) and found that all of them consumed agave mites in the lab. Additionally, when predator mites were placed on agave that were then infested with agave mites to simulate a new infestation, *A. californicus* significantly reduced agave mite numbers and almost prevented infestations from establishing entirely (Fig. 4). This suggests that *A. californicus* mites could be used preventatively to stop agave mite infestations from starting on clean plants. However, in a separate experiment, none of the predator mites were able to significantly reduce agave mite numbers on symptomatic plants that had large existing agave mite populations.

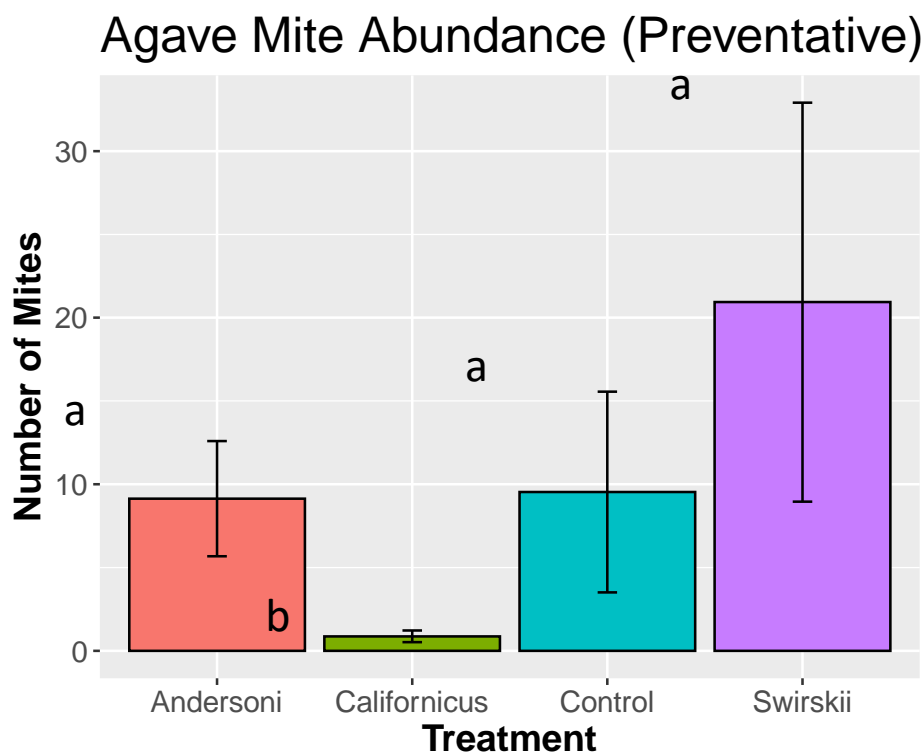


Figure 4. Results from our preventative predator mite experiment. Bars represent the average number of agave mites on plants 3 weeks after predator mites were added, ± 1 standard error. “Andersoni”= *Amblyseius andersoni*, “Californicus”= *Amblyseius californicus*, “Swirskii”= *Amblyseius swirskii*, “Control”= untreated control. Different letters represent statistically significant differences between treatments.

Chemical Control

Agave mites are difficult to manage with miticides. Numerous growers and PCAs we worked with have used a variety of miticides without finding something that prevents symptoms. Unfortunately, this could be for a couple of reasons. As we found earlier, symptoms take months to appear after a plant has been infested, so it is possible that some miticides are effective and eliminate agave mite infestations, but symptoms still appear later from damage that occurred months earlier. This can falsely make effective miticides appear ineffective.

Another problem could be where the mites are located. If contact insecticides are being used without proper adjuvants and thorough coverage, they may never reach the mites deep in the agave core.

Finally, many of the miticides growers and PCAs use could simply be ineffective. In our experience, several growers we worked with were using products labeled for use against spider mites or tarsonemid mites instead of products labeled for use against eriophyoid mites. Some of the difficulty in managing agave mite may simply come down to correctly identifying it and using the appropriate miticides for eriophyoids.

Currently we do not know which miticides are effective and which aren't against agave mite. We will be testing multiple miticides later this summer to determine their efficacy. For now, select miticides that are labeled for use against eriophyoid or eriophyid mites, make sure you achieve thorough coverage on your agave when applying, and strongly consider using an adjuvant that will help the miticide spread into all the crevices of the plant to reach the agave mites. Based on previous research on aloe mites and what we know about agave mite biology, we suspect miticides containing fenpyroximate, spirotetramat, or spiromesifen may be effective, and are labeled for use against eriophyoids.

An IPM Plan

Below is a sample IPM plan for managing agave mite.

Monitoring

Check if any of your agave have symptoms and strongly consider roguing agave with advanced symptoms. Cover and dispose of these plants downwind of the rest of your agave. Continue to monitor your plants for symptoms, especially plants close to previously infested agave.

Prevention

After removing already infested agave, you can deploy predatory *Amblyseius californicus* mites or use miticides prophylactically to help prevent infestations. Sachets of *A. californicus* are available to purchase and may provide preventative control for several weeks. If using miticides, products containing fenpyroximate, spiromesifen, or spirotetramat are likely good choices.

Curing Infestations

If agave mites are established in your plants, applications of miticides labeled for use against eriophyids and combined with adjuvants to increase their coverage are the most likely to be effective. However, the damage the mites caused will persist and may take months to grow out. Unfortunately, predatory mites will not be able to clean up existing agave mite infestations.

Monitor Again

Check your plants multiple times after treatment to evaluate what has worked and what hasn't. Remember that just because symptoms appear later does not necessarily mean plants are still infested with agave mite. If possible, cut up a plant or two and check for mites under high

magnification (30x or greater at minimum) to see if agave mites are still present.

Agave mites are difficult to manage, but hopefully this gives you a decent starting point for controlling this damaging pest. Remember, our research is still ongoing, so stay tuned for future updates from UC Cooperative Extension!

References

- Maggio, M. (2012). Operation Agave Might!: Combating Eriophyoid mite of Agave. *Cactus and Succulent Journal*, 84(6), 283–291. <https://doi.org/10.2985/0007-9367-84.6.283>
- Parker, R. (2018). Agave Mite a Quick and Dirty Primer. *Cactus and Succulent Journal*, 90(2), 104–106. <https://doi.org/10.2985/015.090.0205>
- Villavicencio, L. E., Bethke, J. A., Dahlke, B., Vander Mey, B., & Corkidi, L. (2014). Curative and preventive control of *Aceria aloinis* (Aceria: Eriophyidae) in southern California. *Journal of Economic Entomology*, 107(6), 2088–2094. <https://doi.org/10.1603/EC14234>