

January 22, 2024

Management Recommendations for the Lychee Erinose Mite (LEM)

Daniel Carrillo, Entomologist – Tropical Fruit Crops, UF/IFAS TREC, Alexandra M. Revynthi, Acarologist – Ornamental Crops, UF/IFAS TREC; Jonathan H. Crane – Tropical Fruit Crop Specialist – UF/IFAS TREC; Jeff Wasielewski, Commercial Tropical Fruit Crops Extension Agent – UF/IFAS Extension Miami-Dade County

The purpose of this document is to provide commercial lychee growers with management recommendations for the Lychee Erinose Mite (LEM), *Aceria litchii*. This mite was found infesting lychee trees in Lee County in February 2018 and has now been found in at least 11 other Florida counties, including Miami-Dade.

Damage due to LEM infestations

LEM infestations are generally not lethal to mature trees. LEM infests immature leaves and initially forms small blisters (Figure 1) with silver-white colored hairs, also known as “erinea”. As LEM populations grow, the erinea become reddish-brown and leaves become distorted or curled (Figure 1). Erinea may also develop on petioles, leaves, stems, panicles, flower buds, and fruit (Figure 2). LEM infestation may result in an 80% reduction in fruit production.



Figure 1. LEM infests immature lychee leaves and initially forms small blisters with silver-white colored hairs, also known as “erinea”. The erineum is a reddish-brown hairy mass that, in some instances, can cover entire leaves, which may become distorted or curled. Erinea can also develop on stems. Photos from trees on Pine Island, Lee County, FL, Feb. 2018.



Figure 2. LEM also feeds upon petioles, stems, panicles, flower buds, and fruit. Consequently, erineia may also develop on fruit. Photos from trees in South Miami, Miami-Dade County, FL, Feb-April 2021.

Scouting for LEM

Frequent and regular monitoring of trees should be conducted to detect LEM infestations. Any shoots with emerging stems, leaves and/or panicles are especially susceptible to LEM. Monitoring for the presence of LEM requires regular and careful inspections of the foliage to detect symptoms, especially around the time when trees are expected to flush, are actively producing new leaves, or when panicles are emerging.

Typically, new shoot growth is initiated in response to:

1. Clipping the shoots to remove fruit.
2. Pruning (by hand or mechanically).
3. Fertilization, especially with nitrogen containing fertilizers.
4. Rainfall and/or irrigation during warm weather conditions.
5. Cool winter/early spring temperatures preceding moderately warm temperatures. These weather conditions may trigger panicle emergence. Sometimes emerging panicles have a combination of new leaves and flowers.

Flowering and vegetative strategy to improve the chances of flowering and reduce LEM infestations

The main issue with lychee production in Florida (besides LEM infestations) is the lack of flowering and fruiting. This is because our fall and winter temperatures are often too high to suppress repeated vegetative flushing of the trees. In order for lychee trees to flower properly the shoots must be mature (hardened off, dark green) and dormant (not growing or about to grow) and be exposed to cool temperatures (<60°F) during the winter (primarily December-January). In general, if trees vegetatively flush after September-October, their chances of flowering the next year decrease. Therefore, we have devised a tentative strategy to protect only the main vegetative flush after harvest and the panicle formation period until fruit set. The idea is that if the major vegetative flush after harvest and pruning is well protected from LEM, this healthy growth may be sufficient to allow flowering and fruiting next year (even if additional vegetative flushes are infested with LEM).

To enhance the probability of flowering and fruiting the following year and protect the main vegetative flush after harvest:

1. Do not apply any nitrogen containing fertilizer. In fact, for mature (bearing trees) unless a leaf analysis or obvious nitrogen leaf symptoms appear, drastically reduce or skip any nitrogen applications. Do apply potassium and other essential elements.
2. Harvest the fruit in June.
3. Turn off the irrigation system after harvest (don't irrigate unless we have high temperatures and severe, prolonged drought, and even then, irrigate infrequently).
4. Immediately prune all the shoots on the tree (topping and hedging the entire canopy) after harvest. Pruning will induce a synchronous growth of the vegetative flushes, facilitating their protection with sulfur applications. If no pruning is practiced, the new vegetative flush will occur variably (i.e., some shoots growing now, others later) over an extended period, complicating their protection and requiring more sulfur applications.
5. Protect the new vegetative flush from emergence with sulfur sprays at a 21day interval until the leaves are hardened off (fully mature).
6. Do not attempt to protect additional vegetative flushes with sulfur sprays. Resume sulfur sprays when flower panicles begin to emerge during late winter (sometime during December, January, or February).
7. Begin applying sulfur at panicle emergence through flowering and until fruit is set. Sulfur is known to have low toxicity to honeybees. We recommend applying sulfur in the late evening, night, or early morning to reduce the potential for leaf damage during high temperatures and to avoid periods of high honey bee visitation. Once fruit is set, stop applying sulfur.

Pruning

During harvest, stems are cut (pruned or clipped), but trees should also be hedged and topped to control tree size and synchronize the flushing pattern of the trees. Hedging and topping after harvest promotes all the stems on the tree to vegetatively flush simultaneously and for the panicles to emerge (in late winter) all at the same time the following year. The synchronizing pruning (hedging/topping) must be followed by sulfur applications to protect the new flush (see below). **Pruning without supplementary sulfur applications may aggravate LEM's spread.**

The machines used to top and hedge the grove should be cleaned (strong water spray) of leaf and shoot debris from the previous lychee topping and hedging job prior to arrival to your grove and ideally should be cleaned at your grove prior to moving to another lychee grove.

Tool and clothing sanitation. All tools (e.g., clippers, loppers, hand saws, and chain saws) and equipment (e.g., hedgers, toppers) used for pruning infested trees should be washed with a 10% bleach solution (nine-parts water to one-part bleach) before being used on other trees. Since bleach is corrosive to metal, rinse with water after bleach treatment. After pruning and/or handling infested plant material, all clothing and gloves worn during the pruning and disposal operation should be changed and washed because of the potential to move the mite.

Disposal options for the infested shoots and leaves: do not move infested material off the property.

1. If permitted, bury or burn this material (call the local Florida Forest Service Office for permission to burn at 954-453-2800; <https://www.fdacs.gov/Forest-Wildfire/Wildland-Fire/Burn-Authorizations> – it is important to call for a burn permit and follow the regulations prior to burning).
2. Chipping or chopping all pruned infested plant parts immediately.
3. If neither disposal option is available, double bag the infested material and expose the bags to sunlight for a minimum of three days, which will solarize (overheat) the bagged material, killing the mites.

Sulfur application to protect new flush

The first sulfur application with MICROTHIOL DISPERSS® (at 20 lbs per 100 gallons of water) should be made immediately after pruning. See table below for additional sulfur rates and water volumes for treating trees. Thereafter, applications must be repeated every 21 days from bud break until all leaves harden (up to three-months and 5 applications in total) using the same rate. Retreatment at less than a 21-day interval may be necessary if substantial rainfall occurs. Sulfur treatments during panicle emergence up to fruit set are critical as the mites appear more active at this stage. This period can last up to two months depending on temperatures and the number of panicle emergence events and may require up to three sulfur applications at 21-day intervals. Sulfur is known to have low toxicity to honeybees. However, we recommend applying sulfur in the late evening, night, or early morning during periods of high honeybee visitation.

Warning: Sulfur products are not compatible with oil sprays. Do not use sulfur with oil or within 30 days of an oil spray treatment.

Warning: During periods of high temperatures sulfur may burn foliage and fruit. Use caution when making sulfur applications at temperatures over 90°F, especially when the temperature is predicted to be above 90°F for three consecutive days following a planned spray application. On days suitable for an application, we recommend application in the late afternoon when temperatures usually drop.

Notice: There is a Special Local Needs (SLN) label (see below) for MICROTHIOL DISPERSS® available to all commercial and urban lychee producers for use in managing the LEM on affected lychee trees:

- Users of the label are not required to apply to FDACS for using Microthiol Disperss®.
- Lychee producers should follow the directions for use on the label. The label is the law.
- Commercial growers should maintain spray records and spray logs when applying Microthiol Disperss® as required by their pesticide applicators license.

Rates and volumes of MICROTHIOL DISPERSS® are based on number of trees and tree size and the equipment used. In general, a greater volume of water and sulfur is needed if applying by a handgun and less if using an air-blast sprayer. Remember, good coverage of the leaves is the key to preventing LEM infestations. The amount of mix (sulfur plus water) needed will depend upon the size of the tree's canopy and how many trees need treating.

Based on applying 20 lbs MICROTHIOL DISPERSS® in 100 gallons, consider:

- Small trees (≤5ft tall) could do ~200 trees or more.
- Medium-sized trees (6-10 ft tall) ~100 trees or more.
- Large-sized trees (11-18 ft tall) ~65 trees or less.
- Very large trees (>18 ft tall) ~50 trees or less.

Treating a small number of trees, consider:

- To treat 1 medium-sized tree, mix 3 oz sulfur in 1 gallon of water.
- To treat 1 large-sized tree, mix 5 oz sulfur in 1.5 to 2 gallons of water.
- To treat 1 very large tree, mix 6-7 oz sulfur in 2 or more gallons of water.

Movement of the pest

LEM can be moved or disseminated by the movement of infested plants, especially when plants are propagated as air-layers from infested parent trees. The mite can also be moved by touching the symptomatic leaves and then contacting/touching additional leaves and/or trees. Please do not move LEM by moving infested plant material to new locations. This mite may also be moved on clothing and equipment. After working with infested trees, clothes should be changed/washed, and equipment should be sanitized before working with non-infested trees. See pruning section above for instructions on how to sanitize tools and equipment.

Preventing a LEM infestation

There is no guarantee that LEM will not infest a grove that proactively applies sulfur when trees are about to and during a new vegetative flush (i.e., applications from the emergence of the new shoots and leaves through full maturity of the shoot and leaves). However, anecdotal evidence suggests this may reduce the chances of a LEM infestation, especially if LEM has been detected nearby.

(OD/ext/handouts/2024/UF-IFAS LEM commercial recommendations 1-22-24.docx)