Management Recommendations for the Lychee Erinose Mite (LEM)

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The purpose of this document is to provide 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 several other Florida counties.

Disclaimer: There are no acaricides registered specifically for LEM in Florida and none of the acaricides labeled for lychee have been field tested against LEM. In the absence of data, the following strategies are our best recommendations based on literature reports regarding LEM management in other countries/states where this mite is present.

Damage due to LEM infestations

LEM infestations are generally not lethal to mature trees. However, LEM infestations may result in an 80% reduction in fruit production. We do not know what effect a LEM infestation has on the leaf canopy. Most likely it causes some reduction in photosynthetic capacity and shortens the life-span of the leaves – thus stressing the tree.

Scouting for LEM

Frequent and regular monitoring of trees should be conducted to detect LEM infestations. LEM infests immature leaves and forms small blisters (Figure 1) with silver-white colored hairs, also known as “erinea”. As LEM populations grow, a reddish-brown hairy mass develops on the underside of the leaf, which may cause leaves to become distorted or curled (Figure 2). Erinea may also develop on other plant parts as the LEM population grows. The mites migrate to new shoots and feed upon petioles, stems, panicles, flower buds, and fruit (Figures 3 and 4).
Monitoring for the presence of LEM requires regular inspections of the foliage to detect symptoms, especially around the time when trees are expected to flush or are actively flushing. If LEM is detected, management of this mite relies on coordinated pruning of infested plant parts followed by timed applications of acaricides to protect the new flush.

**Cultural practices**

Pruning is the most important cultural practice against the LEM infestation. However, the timing and intensity of the pruning have not been investigated and may be critical for effective LEM suppression. For instance, LEM primarily attacks new leaf growth and severe pruning, especially when done before a major growth flush, may stimulate vigorous new vegetative growth and aggravate the spread of LEM. Until the effects of different levels of pruning are investigated, we recommend selective pruning of only infested plant parts. A more thorough sanitation pruning can be conducted during the post-harvest period (i.e., usually after June) before the trees become “dormant” during fall and winter. Prune to remove all the infested plant parts including foliage, young stems and/or branches and do not move infested material off the property. If permitted bury or burn this material – it is important to call your local county for burn permit and regulations prior to burning. All tools 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. After pruning and/or handling infested plant material, all clothing and gloves worn during the pruning and disposal operation should be changed because of the potential to move the mite to non-infested sections of the canopy and/or to additional non-infested trees.

**Acaricide treatments to protect new flush**

After removing and destroying infested branches, acaricides (miticides) should be applied to protect the new leaf flush as it emerges and develops (grows). LEM attack primarily new leaf growth but also appear to hide on the bark and therefore applications of acaricides should aim for complete coverage of the foliage, branches and the main trunk. One application should be made after removing the infested plant parts. However, trees are more susceptible to LEM when they are about to flush and while new flush emerges and grows until the new leaves have fully expanded and hardened. This critical period can last approximately 90 days and application of acaricides should be made biweekly.

Among the conventional acaricides registered for use in lychee in Florida, only abamectin (Agri-Mek) has been reported causing high mortality of LEM in laboratory assays conducted in other parts of the world where this mite exists. Recent tests by UF-IFAS in Florida showed that abamectin does not control LEM inside the erinea and only partially protects the new flush from new infestations. Agri-Mek is the only formulation of abamectin registered for lychee. The residual activity of Agri-Mek is increased when combined with horticultural oil or a surfactant because these products assist with penetration and protect the active ingredient from photodegradation. Agri-Mek is toxic to honeybees and should not be sprayed on flowering trees or near active bees. Agri-Mek is a restricted use pesticide (you must have your pesticide license to use this material) and has a restriction of a maximum of two applications per year on lychee. Caution: horticultural oils may cause plant/fruit damage when used under high temperatures and/or dry conditions.
Among the organic acaricides, azadirachtin, which is extracted from neem oil, provides suboptimal control of this mite. Azadirachtin is labeled for use on lychee and can be used as an alternative acaricide while labels for other acaricides are explored. Brand names include Aza-Direct, AzaGuard, Azatrol EC, and Trilogy.

Recommendation for acaricide application to protect new flush from LEM:

1. For all commercial growers:
   a. Obtain permission to burn plant material debris.
   b. Prune LEM infested trees to remove infested branches and leaves.
   c. Burn all stems and leaves on-site (i.e., do not move this material to a new area).

2. For conventional growers (i.e., non-organic):
   a. When trees begin to flush, (i.e., new shoots and leaves emerge) apply Agri-Mek mixed with horticultural oil.
   b. When new leaf flushes have fully emerged but before leaves expand, apply azadirachtin at a 15-day interval (this may be 2-4 additional sprays).
   c. When the new leaves have fully expanded but not hardened off apply Agri-Mek mixed with horticultural oil.

3. For organic growers:
   a. When trees begin to flush, (i.e., new shoots and leaves emerge) apply azadirachtin mixed with horticultural oil.
   b. Continue to apply azadirachtin mixed with horticultural oil as leaves expand, at a 15-day interval (this may be 3-5 additional sprays).
   c. Continue azadirachtin mixed with horticultural oil applications until leaves are hardened off.

4. For homeowners with lychee trees in the home landscape.
   a. Prune trees to remove all infested plant parts.
   b. Bag all the debris and dispose of in the landfill.
   c. When trees begin to flush, (i.e., new shoots and leaves emerge) apply azadirachtin mixed with horticultural oil.
   d. Continue to apply azadirachtin mixed with horticultural oil as leaves expand, at a 15-day interval (this may be 3-5 additional sprays).
   e. Continue azadirachtin mixed with horticultural oil applications until leaves are hardened off.

Sprays of wettable SULFUR have been used to protect new flush of lychee from LEM but SULFUR is not registered for use on lychee at this time; an emergency exemption (i.e., Section-18 or Special Local Needs) pesticide label will be required to legally use this material. Warning: if an emergency exemption is issued for Sulfur, it should be considered that sulfur products are not compatible with oil sprays. Do not make sulfur and oil sprays within 30-days of each other.
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 transferring live mites to additional leaves and 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.
Figure 1. LEM infests immature Lychee leaves and forms small blisters.

Figure 2. The erineum is a reddish-brown hairy mass that, in some instances, can cover the entire underside of the leaf, which may become distorted or curled.
Figure 3. LEM also feeds upon petioles, stems, panicles and flower buds. Photo credit: Leticia Azevedo, Brazil).

Figure 4. LEM also feeds upon fruit. Consequently, erinea may also develop on fruit. Photo credit: Leticia Azevedo, Brazil).