GROWERTALKS

Features

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A Meaner Mite For a Badder Bug

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Let's start off with an overview and some history. Koppert released this apex predator (*Amblydromalus limonicus*) into the American biocontrol market a decade ago. In that time, it's found a considerable market in the cut flower industry, where its staggering reproductive capacity is highly advantageous. In addition to this, it's just larger, faster and generally meaner than its other Type 3 generalist predatory mite relatives: *Neoseiulus cucumeris* (Thripex), *Amblyseius andersoni* (Anso-Mite) and *Amblyseius swirskii* (Swirski-Mite).

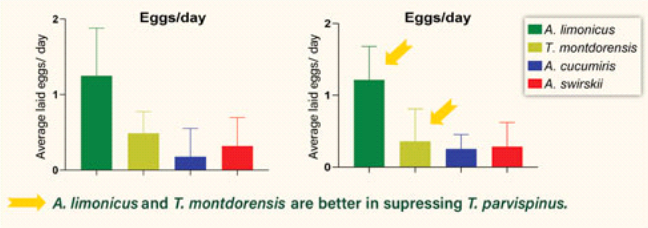
Pictured: An application of bulk Limonica onto a crop of cut flower roses. Limonica has been especially strong in this crop due to its combination of love for the environment and selection of various prey choices.

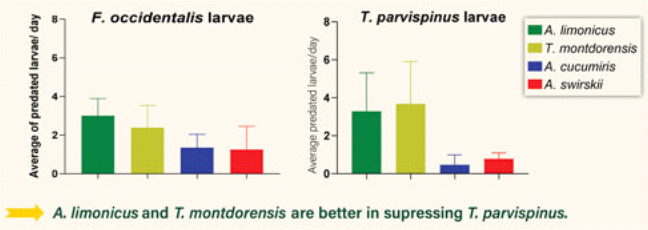


Beyond the success in cut flowers, Koppert's Ornamental Crop team has found great results versus western flower thrips (WFT), whiteflies and spider mites in various high-value crops grown in cool environments. This is a key point to understand and utilize with Limonica—she works well when it's cold. It's been observed on several occasions feeding and laying eggs when it's cool enough in the greenhouse to see your breath and fog up the hand lens. In the world of predatory mites, this is an outlier.

That's not to say that it doesn't work in warmer climates, though it still works well into the mid to upper 80F range. Once temps are in that range, Koppert has generally recommended a move to Swirski-Mite, as it'll still feed and reproduce nearly into triple-digit temperature range. While this approach has historically worked well for WFT and others, pepper thrips (*Thrips parvispinus* or TP) have quickly changed the game for a wide variety of crops.

This pest has caught many a grower on multiple continents flat footed and has caused significant damage to several industries in just a few years' time. In this period, Koppert has conducted several in-house R&D projects to test the efficacy of our various thrips predators and Limonica has come out on top in all of our internal tests.





Initial trial results from Koppert's global R&D Department

In an early test of various predators, Swirski and Thripex both behaved predictably against WFT (the chart with blue and red bars), but then showed a predation rate that was nearly half of that when provided with a diet of pepper thrips. Limonica and montdorensis (Montdo-Mite) really shifted into high gear and nearly doubled their predation capacity against this new pest. It's important to point out, however, that the results with montdorensis aren't relevant here in the U.S. because the USDA classifies it as an "exotic" and prohibits importation to the U.S. Fortunately, Limonica has been safe to import for years and supplies have never been stronger.

Chart 1: In one trial, Koppert compared predation and egg-laying capability of various predatory mites against the new pepper thrips versus predation against a known benchmark, western flower thrips.

Chart 2: Similar to the previous charts, results versus WFT are on the left and *Thrips parvispinus* are on the right. This data strongly suggests that Limonica is the single strongest predator available anywhere for control of TP.

In addition to the feeding rate increases on the larvae, we also saw Limonica behave in a very consistent pattern with what we know it's capable of on WFT: explosive population growth when supplied with a good diet.

Based on this initial test, we've primarily focused on results from Montdo-Mite and Limonica moving forward. Subsequent trials continue to corroborate our initial findings and have provided some enhanced resolution. While the number is still relatively low in comparison to its predation of pepper thrips L1 larvae, Limonica is still quite capable of consuming L2 larvae in laboratory trials.

Dilution is the solution

A unique facet to this mite is how concentrated it can be formulated; it's a "dilute" product relative to our other predatory mites. It's a straightforward process to get Swirski and Thripex into 1-liter tubes with a concentration of 50,000 or more mites. Limonica isn't even remotely similar, though, and we've found it exceedingly difficult to get a quarter of the number in the same volume without substantial cannibalism. That is to say, they're mean! Even given this relatively low concentration of predators per bottle, it's important to remember that due to its enhanced predation and reproductive capabilities, the applied cost is comparable to Swirski-Mite, as the usage rates are typically far less.

A meaner predator eats larger prey

Limonica is special due to its ability to feed on larger larval instars and its high reproductive capacity versus the other commercially available generalists. For example, Thripex, Anso-Mite and Swirski-Mite are all quite capable of feeding on the first stage of WFT that hatches out of the leaf, also known as an L1 or 1st stage larval instar. Limonica has the distinction of being able to truly feed on the L2, or second stage instar, as well, and this is no different with TP. This holds true with whitefly, too, as it's also capable of consuming the larval phases of both main pest species (Greenhouse and Silverleaf, whereas the others primarily just consume the eggs).

Putting all of the pieces together

An effective IPM program is like an intricate puzzle, with pieces that vary from location to location; the unique

variables of each facility must be considered at each operation we visit. Because of this, Koppert doesn't traffic in one-size-fits-all recommendations. We specialize in understanding how all these puzzle pieces work and fit together, then help you build the pest and pathogen-free picture that you want to see. In this analogy, Limonica can be a significant piece of that puzzle. Here are some other pieces to consider for the full picture with TP:

Soil predators like Entomite-M (*Stratiolaelaps scimitus*) and nematodes like Entonem and Capsanem (*Steinernema feltiae* and/or *carpocapsae*) have been shown to help keep pepper thrips populations significantly suppressed.

Are Thripex, Anso-Mite or Swirski-Mite no longer pieces of the puzzle? Absolutely not! Should any of these Type IIIs be in the same place at the same time, though? Also, absolutely not! The risk of intraguild predation is high when mixing any of the Type III predatory mites in the same environment, but that doesn't mean that Limonica is the only answer.

The initial study data also suggests that control is possible with the others, but rates and frequency of intros will need to be much more aggressive. We've seen them play out successfully in several crops already. Environmental conditions, whether the predators like the foliage and can reproduce well, even pre-existing pesticide residues are all variables to account for when selecting the correct predatory mite puzzle piece.



Let's not forget pesticides. While there are several AIs like Flonicamid and Cyantraniliprole that have shown good effect versus pepper thrips and have limited toxicity to the good guys, there's considerable data supporting the usage of softer, mycoinsecticides like Koppert's Isarid. Isarid is formulated as an easy-to-mix wettable powder and growers report that it leaves no visible residue when applied as directed. It's especially formidable when tank-mixed with your IGR of choice and has no risk of resistance in the targeted populations. This means it works best when applied routinely, allowing for the usage of heavier, but compatible, chemical products only as needed.

Pictured: Male and the darker-colored female *Thrips parvispinus* clearly visible along with some fungus gnats on one of Koppert's Horiver Dry Stick White Traps.

Mass-trapping is a critical component as well. For now, Koppert recommends testing multiple colors of sticky cards in your crop to verify which works best, as we've seen some variance in response to color, depending on the crop and the lighting. That said, Koppert's Horiver Dry Stick White Traps have proven to be the best overall, but there are a few situations where Blue traps have performed slightly better. Yellow has not proven to be even remotely as effective as either White or Blue whenever we've tested them side by side.

Wrapping it all up

Limonica is a powerful tool in your pepper thrips defense arsenal. It loves cooler temps, reproduces much more quickly than similar predators that you're likely already familiar with and has a broader range of life cycles that it can feed on. While it can be a large piece of your overall IPM puzzle, there are other products that also warrant consideration.

Koppert's IPM experts are here to help! GO HERE for our consultant map page. Please connect with the Ornamental team member closest to you or just connect directly with our Customer Service Agent that pops up in the chat window. Believe it or not, that's not an AI chatbot, but a real person! **GT**

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