

SPLAT CLM™ for Citrus Leafminer

Instruction and Information Sheet

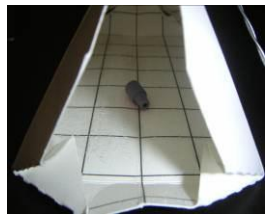




Compared to conventional insecticide sprays, SPLAT CLM mating disruption is species specific to the citrus leafminer (CLM), has no effect on non-target or beneficial insects, and has a field longevity of 8 weeks (or more) with just one application. Mating disruption results can vary depending on many factors such as plot shape and size, the infestation level in the vicinity outside the treatment area, presence of host plants in the vicinity and whether these host plants are well controlled for CLM. In order to maximize the success of your SPLAT CLM application, please be sure to read and understand all of the following documents in the order shown, before using SPLAT CLM.

1. SPLAT User's Guide to Mating Disruption and Attract & Kill Formulations
2. SPLAT CLM for Citrus Leafminer Instruction and Information sheet (this document)
3. SPLAT CLM EPA Label

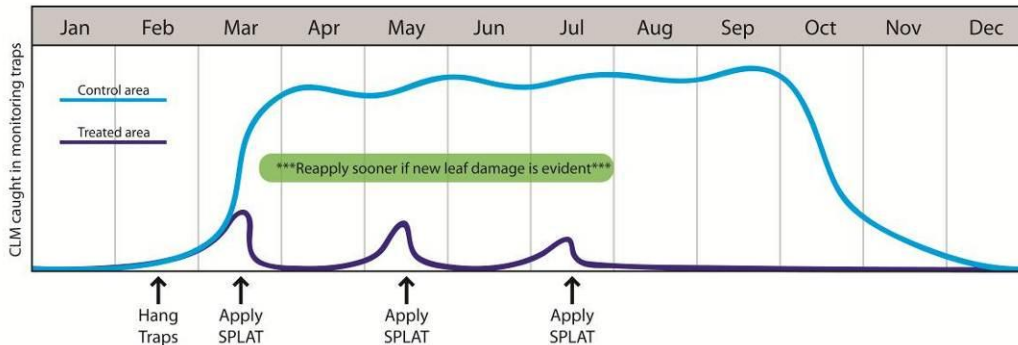
SPLAT CLM is typically packaged in caulking tubes for manual application, or bulk packaged in re-sealable buckets for mechanical application. Some sections of this instruction and information sheet may discuss dispensing SPLAT CLM with a caulking tube, but the application metrics (application rate, dollop size, etc.) are similar and applicable for mechanical application methods or other application methods. Please contact ISCA for information about independent commercial mechanical applicators with experience in SPLAT CLM mechanical application.

SPLAT CLM APPLICATION OUTLINE

(Refer to the following pages for step by step instructions)

				
1	2	3	4	5
<p>Assemble monitoring trap by placing pheromone lure (ISCALure CLM) in delta trap.</p>	<p>Hang monitoring traps in the treatment area when the first flush of leaf growth in the season is detected.</p>	<p>Once the first CLM is caught in the monitoring trap, apply SPLAT CLM as spherical dollops, at 1 gram per dollop.</p>	<p>Hang additional monitoring traps outside the treatment area which do not have CLM control measures, as a comparison (or "control").</p>	<p>Reapply SPLAT CLM when monitoring trap captures equal 40% of control trap captures, or when new leaf damage is evident.</p>

SUGGESTED SPLAT CLM APPLICATION SCHEDULE



SPLAT CLM STEP BY STEP INSTRUCTIONS

ASSEMBLING THE TRAP



STEP 1

Pull the paper delta trap apart so that the glue inside is exposed and the base sits flat.



STEP 2

Fold corners inside along the perforations.



STEP 3

Place ISCALure CLM (the pheromone lure) on its side in the center of the sticky surface. Typically, one ISCALure CLM is used with one delta trap.



STEP 4

Fold up the edges of the trap along the fold lines so that there is only the small opening in the center.



STEP 5

Punch out the hole at the top of the trap and thread the metal hanger through the hole. Loop it around once so that it stays in place.



STEP 6

Bend the other end of the metal hanger into a hook and hang the completed monitoring trap.

SPLAT CLM APPLICATION



STEP 1

SPLAT CLM is packaged in a standard 10 oz. caulk tube for use with a caulk gun. Store SPLAT in a cool place, preferably refrigerated.



STEP 2

Use a knife or sharp object to remove the tip of the cartridge at the 1/4" mark, as indicated by markings on the cartridge.



STEP 3

SPLAT CLM is applied by distributing dollops in and around the area you would like to protect. These dollops can be applied to the horizontal surfaces of branches, fence posts, etc. Horizontal surfaces minimize dollop drippage. When applied to leaves with mechanical application methods, a blower which blows the dollop on the underside of leaves is ideal, to protect dollop from direct rain or sunlight.



STEP 4

Gently squeeze caulk gun trigger to begin flow of SPLAT CLM. Maintain contact between nozzle and surface during flow in order to produce a single, 3-dimensional circular mound dollop.



STEP 5

The ideal size for each dollop is approximately 1 gram, which is roughly 1/2" – 3/4" in diameter. SPLAT has optimal longevity when applied in a circular mound. An irregular/flat dollop, or string of SPLAT will decrease longevity.



STEP 6

Consider applying additional material to borders and high risk areas (such as borders adjoining plots with unprotected citrus trees) to protect against CLM pest pressure outside the treatment area.

SPLAT CLM BACKGROUND INFORMATION

The citrus leafminer (CLM) *Phyllocnistis citrella* is a damaging pest of citrus because the larvae feed by creating shallow tunnels, referred to as mines, in young leaves of citrus plants. Such leaf damage makes the citrus tree susceptible to citrus canker bacterial infection while also reducing overall tree appearance, health and yields. Though CLM damages a variety of citrus plants, grapefruit, lemon, lime and orange appear to be most susceptible to damage and citrus canker bacterial infection. Since 2001, CLM has infested citrus growing regions of the U.S., including California and Florida. In areas where CLM is seasonal (not year round), adult CLM overwinter within canopies of the citrus trees, and overwintering females typically begin to oviposit eggs in leaves around mid-March. Leaf damage is caused when the larvae emerge from the eggs and feed on the leaves. In warmer climates, CLM may be active year round, and so overwintering does not occur.

ISCA Technologies introduces SPLAT CLM, for the control of the citrus leafminer, *Phyllocnistis citrella*. SPLAT is formulated with environmentally friendly, food grade ingredients together with species specific, naturally occurring CLM sex pheromone. SPLAT CLM controls CLM through the use of the mating disruption strategy. Each application is effective for 8 or more weeks in the field depending on environmental conditions and application rate. Because SPLAT CLM control is species specific, it will not have any effect on other insect species or organisms, such as beneficial insects or insect pollinators.

SPLAT CLM can be used as an alternative or a complement to standard insecticide treatments. CLM is resistant to foliar insecticide spray treatments since the damage causing larvae are protected inside the leaves. Since SPLAT CLM treatments only disrupt the mating of CLM, it does not cause any insecticide resistance issues. SPLAT CLM can also be used in conjunction with insecticide treatments to minimize the frequency of treatments and reduce insecticide resistance.

HOW SPLAT CLM WORKS

SPLAT CLM achieves control of the citrus leafminer by disrupting the mating behavior of CLM. The controlled release of the naturally occurring CLM sex pheromone from SPLAT CLM confuses the male CLMs, and disrupts their ability to locate female CLMs for mating. For maximum effectiveness, SPLAT CLM applications should take place when CLM is known to be active, as determined by monitoring traps.

HOW ISCALURE CLM DELTA TRAPS WORK WITH SPLAT CLM

Delta traps baited with ISCALure CLM pheromone lures (monitoring traps) are used to determine the activity level of CLM. Monitoring traps should be deployed early in the Spring: in late February or early March to detect the presence of CLM (see chart above). When the monitoring trap catches the first CLM (typically between February and April), apply SPLAT CLM as described below. When SPLAT CLM is providing adequate control it will reduce the number of CLM caught in monitoring traps. *It is normal and expected to see significantly less CLM in the monitoring traps placed in the treatment area when using SPLAT CLM.* When the trap catch begins to increase again (typically 8 weeks or more after SPLAT CLM application depending on environmental conditions and application rate), it is time to reapply SPLAT CLM.

To evaluate and compare the effectiveness of SPLAT CLM, it is beneficial to monitor the natural population of CLM outside your treatment area. One or two monitoring traps should be placed outside the treatment area, more than 100 feet away from the nearest SPLAT CLM dollop. If CLM are active in your area, the monitoring trap outside the treatment area (control trap) should capture more CLM than the monitoring trap inside the treatment area. The difference in the monitoring trap catch between the traps inside and outside the treatment area provides a gauge of the SPLAT CLM mating disruption effect. The above shown chart “Suggested SPLAT CLM Application Schedule” provides a suggested treatment schedule. The treatment schedule may need to be adjusted based on factors such as the climate, the level of CLM pressure in your location and your application rate. For example, CLM may be active year round and may not overwinter in warmer climates, in which case the treatment schedule should be extended to the entire year.



TRAP PLACEMENT

1. Infestations of leaves are lowest in the winter and early spring, increasing significantly through the late spring, summer and early fall. The timing of monitoring trap placement should be based on the seasonal phenology of CLM populations at your location. If you are unsure about the seasonal phenology of CLM at your location, hang monitoring traps from March to November for the first year, and make weekly counts of the CLM caught in your monitoring trap to understand the seasonal phenology. The bottom panel of each paper delta trap may have a printed chart that you can use to record CLM counts. Performing weekly CLM counts can also provide you with indications of the effectiveness of your CLM control measures.
2. Monitoring traps are hung at shoulder height on the south side of the tree in winter and on the north side in the summer. Place the monitoring trap on the inside of the canopy in trees, in open shade, with 8-10 inches of clearance from foliage at the edge of the grove.
3. Each ISCALure CLM pheromone lure will remain effective for up 8 weeks or more depending on environmental conditions. Replace monitoring traps and lures after 8 weeks, or earlier if you notice that ISCALure CLM has lost its attractiveness. Discard used traps and lures in sealed trash bags.

SPLAT CLM PLACEMENT

1. SPLAT CLM is supplied in a caulking tube for use in most 10 oz. caulking guns. Cut the tip of the cartridge so that there is a large opening, such as the 5/16" marking on the cartridge.
2. SPLAT CLM is applied directly to the plant, under the canopy, in an area that is not exposed to direct sunlight, out of the reach of children, pets or anything that may inadvertently dislodge the SPLAT CLM dollops.
3. The ideal SPLAT CLM dollop placement is on a secure branch, but SPLAT CLM dollops can also be applied to a large leaf or non-absorbent surface that will support the weight of the dollop.
4. SPLAT should be applied to a horizontal surface, or the elbow of a branch, which most easily supports the weight of the dollop. Application to a vertical surface can cause the dollop to fall off under its own weight.
5. If SPLAT is too runny and will not form a dollop shape, place the tube in the refrigerator for 1 hour and reapply.
6. In addition to application to the actual citrus trees, additional SPLAT CLM material should be distributed throughout the application area, so that SPLAT dollops are spread evenly throughout the area to be protected. If possible, all dollops should be at the height of the canopies and out of direct sunlight.
7. SPLAT CLM should be applied to produce a 3-dimensional round shape (dollop), like a marble. Flattened or stringy dollops will have reduced longevity in the field.
8. The ideal size of each dollop is approximately 1 gram, or roughly 1/2" – 3/4" in diameter.
9. Check the weather forecast before applying SPLAT CLM. **Avoid applying SPLAT CLM less than 3 hours before rain**, since the rain may dislodge the SPLAT CLM dollop. After 3 hours, the SPLAT CLM dollop will cure and a normal level of rain will not affect the SPLAT CLM dollop.

SPLAT CLM APPLICATION RATE

SPLAT CLM should be applied so that the dollops are distributed evenly throughout the treatment area. The amount needed can vary on many factors, use the chart below as a guide or contact ISCA for the most accurate recommendation. Please refer to skip row guidelines if you choose an application rate which is less than 200 grams per acre. For larger areas of more than 10 acres, skip row guidelines allow for lower application density of SPLAT CLM dollops, by skipping rows which are applied with SPLAT CLM, which consequently lowers the cost per acre.

Area	Application Rate	Notes
Less than 2.5 acres	Not recommended	Some areas less than 2.5 acres can be treated with SPLAT CLM, contact us for details.
More than 2.5 acres	300 grams per acre	Caulking tubes optimized for manual application
More than 5 acres	200-300 grams per acre	Caulking tubes or bulk packaging.
More than 10 acres	140 to 200 grams per acre	Bulk packaging optimized for mechanical application. Skip row application guidelines can be used depending on economic feasibility and damage threshold.

Apply 20% more SPLAT CLM dollops to the border (a.k.a. perimeter) of the treatment area; and the remaining SPLAT CLM dollops evenly distributed inside the treatment area. When the treatment area is protected, all the plants within the treatment area should have a reduction of leaf damage from CLM regardless of the number of trees inside the border.

Skip row application guidelines:

The application area for skip row application should meet the following criteria:

- 10 acres or more
- Rows should be more than 600' wide and not irregularly shaped
- Minimum of 14 rows (assumes row spacing of 22 - 28'; 25' is common)

Skip row application guidelines:

1. Skip rows based on
 - 4 skipped rows for every 10 rows treated with SPLAT CLM
 - application rate of 140 grams of SPLAT CLM per acre.
2. The border of the treatment area should be treated with SPLAT CLM, that is, treat end trees of skipped rows.

STORAGE INFORMATION

1. SPLAT CLM should be kept in the provided tube or bucket, sealed and stored in the refrigerator. Place tubes horizontally for storage. Do not store in freezer or expose to freezing temperatures. Do not expose to high temperatures. When stored properly, SPLAT CLM will have a shelf life of 2 years.
2. After removing SPLAT CLM from refrigerator for use, with manual application, SPLAT CLM can be used immediately; with mechanical application, SPLAT CLM may need time to warm up to suit the viscosity needed for the mechanical application equipment. Warmer SPLAT is less viscous (thinner), colder SPLAT is more viscous (thicker).
3. Unused ISCALure CLM pheromone lures should be kept in the provided package, sealed and stored in refrigerator. For longer product shelf life, store in freezer. Delta traps should be stored in a cool and dry place. When stored properly, ISCALure CLM will have a shelf life of 2 to 5 years.

OTHER INFORMATION

1. CLM are attracted to new flush of leaf growth. Avoid pruning live branches more than once a year, so that the cycles of flushing are uniform and short. Once the leaves harden, the pest will not be able to mine the leaves. Do not over prune leaves damaged by CLM because undamaged areas of the leaves continue to produce food for the tree. Minimize application of nitrogen fertilizer at times of the year when CLM populations are high as new flush of growth may be damaged.
2. The effectiveness of SPLAT CLM control is also contingent on the effectiveness of control measures in host plants outside the treatment area borders. If CLM is uncontrolled or not well controlled outside the borders, they can reproduce and mated CLM females can migrate from outside the borders to damage host plants inside the borders. Where possible, host plants which are close by outside the border should preferably be included in the SPLAT CLM treatment area.
3. SPLAT CLM is registered and approved by US Environmental Protection Agency for the control of CLM, EPA registration number 80286-15.
4. The standard disclaimer for the information and use of ISCA's products can be found in the ISCA Technologies [Standard Terms and Conditions of Sale](#). You may also request that a copy be sent to you.
5. Please feel free to view the latest ISCA products and product support information at the ISCA [Product Support](#) website.