

How to Construct a Blacklight Trap

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HOW TO CONSTRUCT A BLACKLIGHT TRAP

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What is a blacklight trap?

Blacklight traps are a successful collection method for a wide variety of insects, including triatomine bugs (aka kissing bugs or conenose bugs). The blacklight trap consists of a **light source**, **power source**, **vane**, and **funnel**. The blacklight attracts flying insects, which hit the vane or the light, fall through a funnel, and remain within a container. These traps require very little effort and tend not to damage the insects.

Materials and Tools

- LED blacklight strip kit (10 m ribbon)
- 2 rechargeable 9V batteries
- 2 9V snap cap connectors
- 1 9V battery charger
- 4 transparency sheets (or 2 see-through materials that can act as a vane – stronger materials such as corrugated plastic or mesh screening may work better)
- 1 5-gallon bucket
- 1 galvanized 4-quart steel funnel
- Pieces of recycled cardboard (i.e. from cereal boxes, paper towel rolls, egg cartons, etc.)
- Duct tape
- Electric tape
- Scissors
- Soldering wand with solder
- Hot glue gun and hot glue
- 1 plastic plant saucer
- Packaging tape

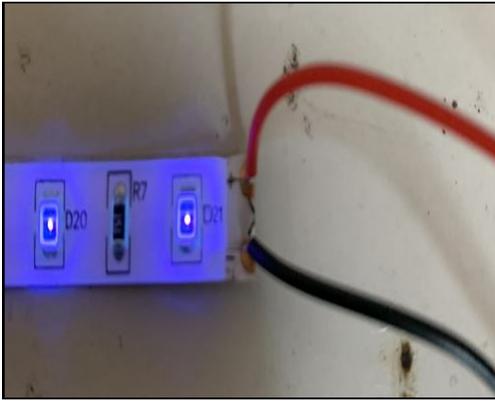
Construction

Light Source

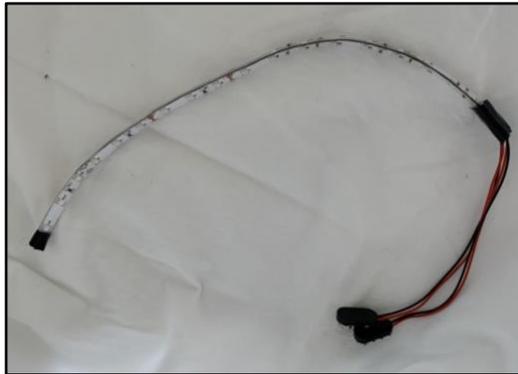
1. Use scissors to cut along the marked areas of the LED blacklight strip so that you have 2 strips, each with 9 lights. Remove the adhesive wrapping on the back of the strips.



2. Use the soldering wand to solder a 9V snap connector to the copper area of each of the 2 blacklight strips. The black wire connects to the negative part of the strip, whereas the red wire connects to the positive area. Each strip will have one snap connector. (you can use a rechargeable battery to test whether the connection works. I would also recommend gently pulling the snap connectors to make sure your soldering is secure).



- Hot glue the two blacklight strips together (back-to-back) so that 9 lights are facing the opposite direction. Use electric tape to secure the soldered area and the bottom of the two strips.



- The LED strips can now be connected to 2 rechargeable 9 V batteries for power.



Vanes

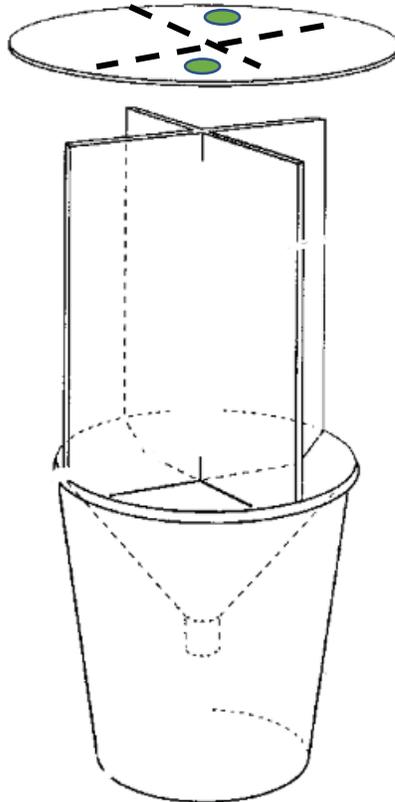
Note: Instead of transparency sheets, you can use transparent corrugated plastic sheets or a mesh wire screening material. These materials may be stronger than the transparency sheets.

1. Lay two transparency sheets on top of one another. Complete this step twice for a set of two double-layered transparency sheets. The double-layer adds strength.
2. Fold a piece of packaging tape over the ends of the layered sheets to stabilize them.
3. Holding the sheets in portrait orientation, use scissors to cut a line approximately 1/3 of the length (~3.6 inches) in the center of each of the double-layered sheets.
4. Connect the two sheets along the cut line, by sliding one onto the other, to create cross vanes. The double-layer transparency sheets should be perpendicular to each other, creating a cross pattern.
5. Use hot glue and tape to stabilize the vane.
6. Cut 45-degree angles at the base of each sheet. This will make it easier to tape to the funnel.
7. This step is tricky, but the vanes don't need to be perfect.



Final Assembly

1. Cut two holes in the plant saucer. The holes should be large enough for the blacklight strips and wires to fit through. The blacklight strip will go through one of the openings, while the wires will go through the other. The holes will fall within two opposite vane quadrants (example below; holes are represented by green circles). You will need to orient this with the vane to make sure the holes match up with the transparency sheets and the blacklight strip can hang on one side.



2. Tape the saucer to the top of the vane.
3. Tape the vane-saucer to the steel funnel. Make sure there is enough room for insects to fall down the hole of the funnel. Duct tape will be your best friend, but it will require some maneuvering.
4. Place the cardboard pieces in the 5-gallon bucket. These provide insects with hiding spaces, which prevents them from eating each other.



5. Tape the funnel-vane to the 5-gallon bucket. Place the blacklight strip in one of the plant saucer's holes so that it dangles on one side. Then, attach the two charged batteries to the snap connectors and tape them to the opposite side of the saucer (opposite to the blacklight strip).



Trap Placement

Trap placement is very important! You can build the best blacklight trap, but it will fail if it is not in an area where triatomine bugs frequent. If you set the traps near private homes, you can ask residents where they see the most bugs. If historical data is unavailable or residents are unsure of triatomine bug hotspots, place the traps across from potential triatomine bug habitats. Habitats include woodpiles, rock piles, woodrat/packrat nests, clutter in the yard, desert plants like prickly pears, etc. Additionally, place the trap under rain cover if there is a chance of precipitation and secure it with a brick or rock if there is heavy wind.

In the image below, we placed this blacklight trap near a resident's window because they said this was a triatomine bug hotspot – sure enough we caught some!



Steps and materials adapted from: White, P., Glover, K., Stewart, J. & Rice, A. (2016). The Technical and Performance Characteristics of a Low-Cost, Simply Constructed, Black Light Moth Trap. *Journal of Insect Science*, 16(1), 25.

For more details on trap application see: Alvarado, A. (2022). *Chagas Disease Risk in National Parks: Exploring Employee Knowledge and Behaviors and Optimal Trapping Strategies for High-Risk Areas* [Masters thesis, Cornell University].