Standard Operating Procedure for the assembly and deployment of the CDC Light Trap

Effective Date: 7 February 2022

SOP #: CLT-2021

PacMOSSI
Pacific Mosquito Surveillance Strengthening for Impact

Scope

The purpose of this SOP is to outline the materials and processes required to perform surveillance of adult mosquitoes using CDC miniature light traps.

Overview

Description: The CDC light trap is a type of chemical/light baited trap that was initially described by Sudia and Chamberlain (1962), and has been used widely. The suction fan runs using a battery or power source, and they can be used with different attractants usually a light source or CO_2. Similar in use and deployment to the Encephalitis Vector Survey (EVS) trap.

Target species and physiological states: Captures host-seeking female mosquitoes.

Entomological surveillance indicators: Adult vector species occurrence and density.

Advantage: The CDC light trap is simple, light and portable.

Disadvantage: This trap requires a battery and its fan can damage specimens. The efficiency of the trap depends on the target species.

Sample period: Usually deployed overnight or for 24 h periods. Use can be extended for a week long period, especially if using a reliable power source and a CO_2 tank.

Data: Total number of females per sampling effort (by species).

Materials

- ◯ CDC miniature light trap
- ◯ 6 V rechargeable battery
- ◯ Battery charger
- ◯ Spare light trap bulbs
- ◯ Spare batteries
- ◯ Data collection forms/digital device
- ◯ Pens/pencil
- ◯ CO_2 source (dry ice or tank, optional)
- ◯ Labels

Trap assembly

1. **Gather all trap components.**

2. **Connect the collection cup to the trap bag.**

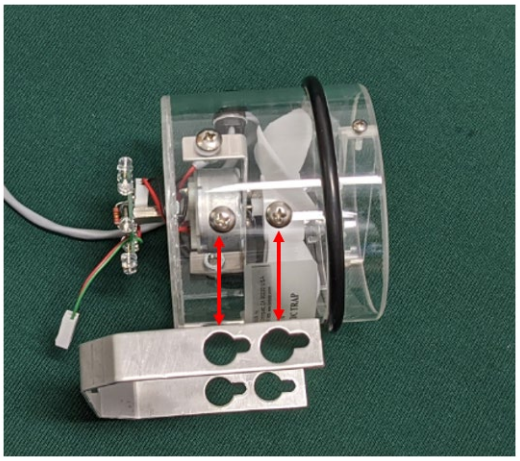
   a. Feed the end of the trap bag without the elastic drawstring through the cup bag, until the thick end is all through.

   b. Push the top of the cup (the open end without the mesh) through the bag end.

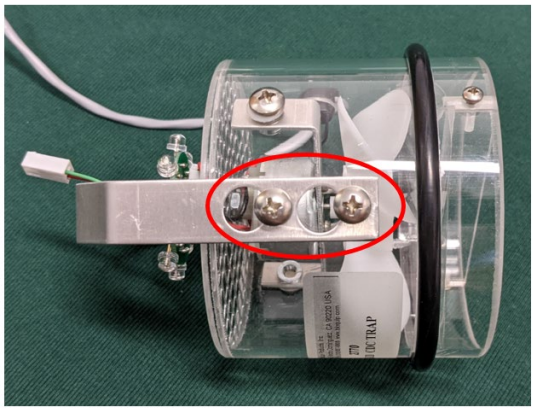
c. Screw the cup firmly into the ring. Ensure that the thick end of the collection bag is overhanging all around the cup.

3. Connect the bracket to the trap body screws.

a. Align the bracket with the two screws on the side of the trap body (red arrows). Note that the trap light and grate are positioned at the top of the trap.

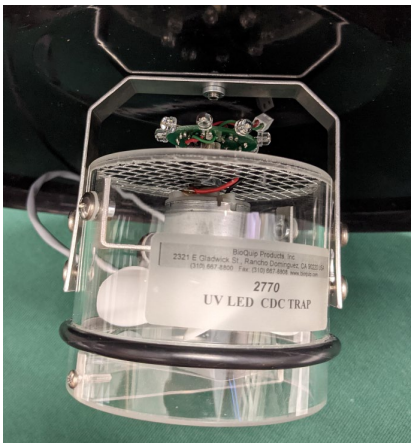


b. Fit the larger spaces in the bracket holes over the heads of the screws and pull up so that the screws are firmly locked into the smaller spaces of the bracket holes (note red oval).



4. Connect the trap body to the lid.

a. Align the hole in the top of the bracket with the hole in the middle of the lid. Note that the lid curves downwards like a bin lid, not upwards like a bowl.

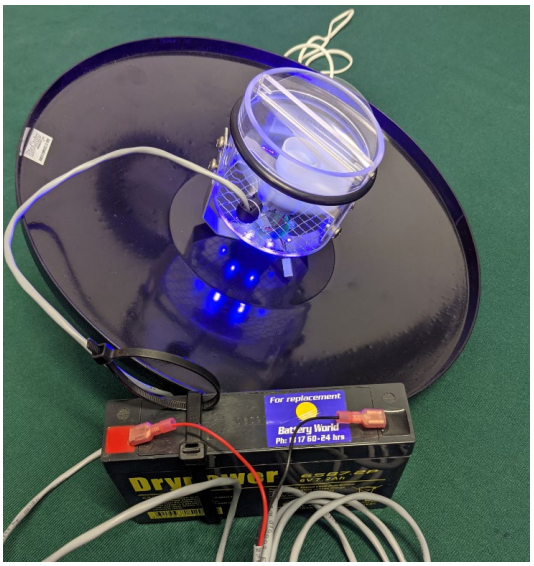


b. Screw in the black trap screw from the top side of the lid until it is firmly in place.

5. Connect the battery to the trap body to ensure that it works.

a. Ensure that the red cable end is connected to the battery's red terminal and the black cable end is connected to the battery's black terminal.

b. Note that if there is a loud buzzing sound, the thin plastic cover under the fan may be hitting the fan. Disconnect the trap body from the battery and very gently pull this cover off the fan, ensuring that you don't break it or pull it out of the trap body. Reconnect the trap body to the battery and ensure that this noise is no longer present.



6. Connect the trap bag to the trap body.

a. Fit the elastic drawstring over the rubber ring at on the trap body and pull the drawstring tight so that the trap is secure.

Additional notes:

- **Ensure that all batteries are fully charged and will have sufficient power to last the night and that all traps have been cleaned with soapy water.**

- **The trap uses around 320 mAmps (0.320 Amps) of power per hour (Hock, accessed 2021). Therefore a 6V battery which 7.2 Ah will last 22.5 hr (7.2/0.32). If you wish to deploy it for longer than one night you will need a different 6V battery with a larger capacity (Ah).**

- **Check the speed of the fan and intensity of the light for any problems.**

- **The CDC light trap can be used with a single white LED light or with UV blue lights. Note that the UV light model catches more bycatch.**

Lures

1. The CDC light trap can be used with an odourant lure to attract mosquitoes to the location of the trap. The lure is usually a source of CO_2 from one of the following options:

    a. **Dry ice (will only last for 12 hours).**

    b. **CO_2 tank.**

    c. **Near the feet of a human host protected by a bednet.**

    d. **Animal host.**

2. The CDC light trap can be used with only the light as an attractant. Although, catches are usually less.

Trap location selection

1. Talk with the householders about the location to place the trap. Ensure that the householders are happy with the location of the trap so they will be unlikely to move it. If no suitable trap location is identified in agreeance with the household, you must not place a trap in that property.

2. Ensure the trap is placed in a location where is will not be hazardous (electrical concerns, trip hazard, aggressive dog nearby) to the occupants or staff servicing it.

3. Discuss permission to service the trap if the occupant is not home. If permission is granted, ensure the trap is in a location that is easily accessible when the occupant is absent.

4. Ensure that trap is in a safe location where it is unlikely that children will play with it or that animals or passers-by will damage it.

5. Do not place the trap on an ant nest or touching the wall under a light where animals such as geckos may be active and interfere with mosquito samples. If ants attack the mosquito samples either move the trap or apply a preventative substance (for example with petroleum jelly or vaseline) on the rope or cords.

6. The specific location where the CDC light trap is placed will greatly affect the mosquito capture rate.

    a. The top of the trap should be 1.5 m from the ground.

    b. Place the trap in locations sheltered from wind, water (rainfall or irrigation) and direct sunlight. Not only do these environmental factors negatively influence mosquito activity they also can impair trap effectiveness.

    c. Avoid placing over open water or in pastures or areas which have artificial light, strong winds, smoke as these factors will reduce catches.

Trap deployment and servicing

1. **Hang the CDC light trap so that the lid is 1.5 m above the ground.**
    a. Traps can be hung outdoors or indoors

2. **If you are concerned about ants affecting your samples then put a liberal amount of Vaseline around the cord and the power cable so that ants cannot walk along these parts.**

3. **Connect the battery to the power cables.**
    a. As DC motors reverse their direction of rotation with voltage polarity changes, care needs to be taken that the red (+) battery lead is attached to the positive terminal of the battery and the black (-) lead is attached to the negative terminal of the battery.
    b. If you are concerned about rain or other damage to the battery, consider protecting in a rainproof cover and/or placing it in an elevated position.

4. **The trap should be running now.**

5. **To service the trap:**

   a. Place one hand around the trap bag so that mosquitoes cannot escape and undo the drawstring with the other hand.

   b. Continue to pull the drawstring closed then loop and tie it around the end of the bag to be confident that the drawstring will not become loose.

   c. Lastly, disconnect the battery from the trap.

6. **Temporarily store the mosquitoes in labelled catch bags until processing and long-term storage. For further details see** SOP# MOS-2021.

Videos

To watch a video on how to assemble and deploy CDC light traps go to:

- How to assemble and deploy the CDC light trap – https://youtu.be/atRmbCXZaEw

Safety/Risk assessment

Your workplace may require you to complete a risk assessment prior to conducting field work. There are a range of risks to which field workers could be exposed, and when sampling with CDC light traps may include:

- Mosquito transmitted infections
- Battery hazards
- Dogs

For further details on safety and risk assessments see SOP# MOS-2021.

References

Hocks, J.H. (accessed 2021) 'CDC Miniature light trap – model 512: Instructions.' https://www.johnwhock.com/wp-content/uploads/2012/10/instr_512_CDCMiniature.pdf

Sudia WD, Chamberlain RW. (1962) Battery-operated light trap, an improved model. *Mosquito News*. https://www.biodiversitylibrary.org/content/part/JAMCA/MN_V22_N2_P126-129.pdf

Acknowledgements

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