

# Tutorial

## How to become a ZomBee Hunter!



# What You Will Need to Participate in ZomBee Watch

- Resealable containers to isolate samples of honey bees that you collect. You will need **one container per sample location**.
- Tweezers or forceps to handle honey bees.
- A pen and adhesive labels to label containers with locality and date information.
- A notebook to take notes about your sample.
- A smart phone or digital camera to take photos of bees, Zombie Fly pupae and adult flies.
- A commitment to provide accurate data and to handle honey bees carefully and safely.

# How to Find ZomBees

1. Look for honey bees
  - flying around lights at night,
  - stranded under porch lights, street lights, etc during the day
  - crawling, disoriented or dead on sidewalks
2. Construct a light trap and place it near an area where you have found stranded bees or, if you are a beekeeper, near your bee hive/s.

**Do not collect honey bees near hives unless you are a beekeeper.**

# Potential ZomBees



ZomBees are often found on sidewalks and under lights, crawling in circles or unable to walk or fly.



They also come to lights at night, sometimes even entering homes through open windows.

# Collecting Stranded Honey bees



Honey bees found stranded or dead under a porch light.

The simplest method of finding potential ZomBees is under a porch light or a street light.

Always handle honey bees safely. Weak and dying bees can still sting you.

# Light Trap Sampling



Using a light trap is the most effective method for finding ZomBees.

A commercially available light trap.



There are many inexpensive ways to build effective light traps from materials around your home. Next, we will show you three simple designs for light traps.



# Light Trap 1



**Materials Needed:** Medium-sized flowerpot, compact florescent light bulb, metal light fixture with cage, and duct tape

## **Assembling the Light Trap:**

If the plastic pot has a hole, use duct tape or a cork to seal it.

Invert the metal light hood and tape it to light cage. This will act as a funnel to trap insects attracted to the light.

Place the Light Trap assembly into the plastic pot and attach with duct tape.

## Light Trap 2: Our Least Expensive Design



This trap is made from a safety light holder and a half-gallon juice bottle.

Cut the top off the bottle, invert it and secure the light cage to the bottle with twist ties.

Here, we use a compact black light bulb that has a visual spectrum particularly attractive to insects. If you prefer, using a normal compact florescent bulb is also fine.



# Light Trap 3: Variation on a Basic Design



This trap requires a:

5-gallon bucket,  
12-inch-diameter funnel  
12-inch utility light

A structure to support the  
light. Here we use a  
custom-designed  
Plexiglas light  
stand

# Setting up your light trap and storing samples

If possible, place your light trap in an area where it is away from nearby light sources.

For example, if you have found dead or stranded honey bees near your back porch light, set up the light trap in your back yard and turn off your porch lights while using the trap.



Store bees in a resealable container.

# Storing Your Sample



Carefully, transfer honey bees that you find stranded or in your light trap to a holding container.



Almost any resealable container will work!

# Monitoring Your Samples

Keep samples of honey bees found stranded or from light traps in a secure place away from the sun. Honey bees in these situations are not healthy and die quickly.

Check each sample periodically for fly larvae (maggots) and brown pill-shaped fly pupae (expected 5-14 days after collection) and adult flies (15-28 additional days). These time periods could be different depending on the temperature at which your sample is stored.



Emerging maggots.



Honey bee with Zombie Fly pupae.

# Upload Information About Your Sample

- Visit the ZomBee Watch Site.
- Upload a photo of one or a group of honey bees from your sample as soon as possible after collection and follow instructions to indicate the sample location.
- Count the number of honey bees in your sample and enter the number into the ZomBee Watch database and save your sample information.
- If fly pupae emerge from your sample, count them and upload a photo of a honey bee and fly pupae and save your sample information.
- If Zombie Flies emerge from the pupae count them and upload a picture of a honey bee with flies next to it, save and submit your sample when it's complete.
- Try to make your images as sharp and in as high a magnification as your camera set-up will allow.



Image of a honey bee and Zombie Flies taken with a Smartphone.

# Be Sure to Keep Your Sample of Adult Flies.



Zombie Flies preserved in rubbing alcohol

We may ask you to send them to us to confirm their identification.

# No Pupae? No Problem!

- Sometimes no pupae will emerge from a sample. There can be several reasons for this.
  - The honey bees were not infected.
  - The fly larvae died inside the bees.
  - The bees reacted to some other kind of stress.
- Finding regions where honey bees are not infected by phorids is an important goal of ZomBee Watch. Your observations are valuable. Be sure to return to ZomBee Watch and update your sample by entering zeros in the appropriate boxes for number of pupae and adult flies and then submit your sample.
- Keep sampling at different times and report your findings.

