



## Pheromones Traps for Detection and Monitoring of Insect Pests

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### INTRODUCTION

A crucial technique for the early identification and surveillance of insect pests is the use of pheromone traps. This article gives fundamental details on the utilisation of both conventional and organic crop producers-appropriate pheromone traps.

Chemical pesticides are a key component of agricultural insect pest management. However, there are drawbacks to pesticide use, including resistance building in pests and environmental pollution as well as contamination of produced agricultural yield. Pheromone trapping can offer instruments for tracking target insects' movements and activities, providing data that can help with insect pest control.

### What is a Pheromone trap?

A pheromone trap is a type of insect trap that entices insects using pheromones. The two most often employed kinds are aggregating and sex pheromones. Pheromone traps are extremely sensitive, attracting insects that are present at very low quantities. They are frequently used to identify the presence of exotic pests, as well as for collecting, monitoring, and figuring out when a pest first appears in a particular location.

Animals like insects and other creatures utilise pheromones as a form of communication. To attract mates, warn others of predators, or locate food, insects release these chemical messages. Traps can be used to monitor target pests in residential or agricultural settings by using certain pheromones. You might be able to see an infestation coming on by keeping an eye out for insects all the time. The harm caused to agriculture and other plants can be reduced by early identification of pest insects using pheromone traps. It may also reduce the number of stinging insects that are present close to you.

### Applications of Pheromone traps-

Insect traps with lures carrying sex pheromones are set up in the field at a suggested spacing. Over a period of 2-4 weeks, the lure will continuously emit the sex pheromone. Male moths are drawn to the area and, while trying to mate, fall into a pesticide-filled container. Because of this, the female moths in the field are unable to breed or lay healthy eggs.

### How to utilise pheromones in an insect trap-

Pheromone lures are rubber capsules with synthetic pheromones inserted inside of them. Depending on the type of pheromone used, the lures may draw insects that are either males or females or both.

Using sex pheromones to prevent mating is the most used technique for catching insects. Here, we scatter the pheromone lure in various areas to prevent insects from locating a suitable mate. Either male or female insects will be drawn to the bait and fall into the trap when they detect the chemical with their antennae.

As a result, insects of the opposite sex won't be able to mate, which lowers the number of insects in the following generation. So, with fewer hazardous insects, the crops will be protected.

### Different types of traps

#### 1. Sticky traps-

Gum-based traps called "sticky cards" are often used in pest management to collect and keep track of insect pests. Sticky cards typically consist of a coating of gluey material that sticks to a cardboard piece. The majority of sticky traps are pesticide-free, however some may be infused with pheromones that are meant to attract particular pests.

**Target pest-** Whitefly, Leaf miner, Aphid, Cabbage root fly, Cabbage white butterfly, Cucumber beetles, Thrips, Tea mosquito bugs, Leafhoppers, Brown planthopper.

**Crops:** Vegetables and Flowers



Fig. 1: Sticky traps for monitoring insect pests

#### 2. Delta traps

The centre of the trap, which was folded into a delta form, is where the lure is put. To draw insects, it is also constructed of plastic or sheeting in the colour yellow. It is simple to use and put together.

Target pest: Diamond Back Moth, *Tuta absoluta*.

**Crops:** Tomato, Potato, Cabbage, Cauliflower, Broccoli, Brussel sprouts.



Fig. 2: Delta traps installed in field

### 3. Funnel traps-

Funnel traps typically have an insecticidal strip within the collection container and a bait dangling from the bottom of the centre of the trap.

**Target pest-** Bollworm, Shoot and fruit borer, Tobacco caterpillar, Pink Bollworm, Yellow stemborer, Fall armyworm.

**Crops:** Bengal gram, Cabbage, Chilli, Chrysanthemum, Cotton, Cow pea, Green gram, Groundnut, Maize, Okra, Red gram, Rice, Sorghum, Soybean, Sunflower, Tomato, Cotton, Pigeon pea, Chickpea, Sorghum, Peas, Tobacco, Potatoes & Maize.



Fig. 3: funnel traps for trapping insect pest

### 4. Bottle traps-

In order to ensure that flies should enter the bottle and become imprisoned, holes were put on it. The bottle trap also has a bait to draw male flies, which is hanging in the centre of the cap. The cap's yellow colour is kept in order to draw insects.

**Host Crops:** Gherkins, Cucumber, Mango, Pumpkins, Mask melon, Watermelon, Guava, Sapota, Citrus, Banana, Papaya, Gourds.

**Target Pests:** *Bactrocera cucurbitae* (Melon fruit fly), *Bactrocera dorsalis* (Oriental fruit fly), *Bactrocera*

*Zonata* (Peach fruit fly), *Bactrocera correcta* (Guava fruit fly).

5. **Water pan traps-**

Place the pheromone on the upper centre portion of the trap after placing

it in the container. Up to the brim with water, fill the trap.

**Target Pest:** *Tuta absoluta*

**Host Crop:** Tomato, Potato, Eggplant (Brinjal) and Capsicum.



Fig. 4: Water pan trap

6. **Bucket traps-**

Using the opening, an insect may easily enter the bucket. simple to hang With the use of a gunny sack, insects may be transported into the bucket with ease. The trap must be placed around the tree at a height of five feet or less from the ground, and it must be fastened by pouring water.

**Target Pest:** White grubs, Rhinoceros beetle, Red palm weevil.

**Host Crop:** Sugarcane, groundnut, chilli, guava, coconut, tobacco, potato, betel nut, oilseeds, pulses and vegetables.

**Pheromone lure**

The most important component, in addition to the other three, is a rubber capsule filled with pheromone, often known as a pheromone lure. These capsules include substances that have been impregnated to attract insects. These

insect-specific lures are created using natural or artificial ingredients. A lure only works for three to four weeks, and farmers must replace it after a certain period of time.

**Installation techniques-**

1. **Plastic is wrapped around the funnel's base**

To serve as a collecting mechanism, a clear plastic sheet is stretched around the funnel. A PVC plastic collecting device is, however, furthermore accessible in some traps.

The plastic sheet should have a minimum width and length of 4-5 inches and 10-15 inches, respectively. To keep insects from escaping, it is wrapped around the base of the funnel and secured at the other end with a rubber band.

## 2. Putting the gadget in place on the field

In the agricultural field, the traps must be fixed in an appropriate stand. The stand may be inserted into the base or funnel of the trap.

First, erect standing poles in designated fields with lengths 1 foot greater than crop canopies. Place the traps in the pole now and connect them with a knot. Additionally, these traps may be hung from tree branches or other similar locations.

## 3. Replacing the lure

Insert the rubber capsule (Pheromone lure) on the downward side of the funnel using rubber gloves / clean cotton cloth. The lid contains a special structure to hold the pheromone lure in its place.

### Taking precautions when installing-

#### 1. Avoid bare-handed contact with Pheromone lure.

The efficacy of a lure might be diminished by the grime and oils on our hands. When handling and installing the lure, we must cover our hands with cotton cloth or rubber gloves to prevent contamination. Before installation, washing your hands with soap and water will also work. Additionally, the life package should only be opened during installation.

#### 2. When collecting plastic during the rainy season, make tiny holes in it.

Water may infiltrate through the collecting plastic in considerable volumes after persistent rains. To prevent this, one must use matchsticks or pins to puncture tiny holes in the collecting plastic so that rainwater may drain out. Only the water must escape via the little opening. One can

drain the water by releasing the bottom rubber band if the rain is not too heavy.

## 3. Inspection

Keep track of the types of insects drawing attention to the trap on a regular basis. You must release the insects and change the bait if you set up a trap for whiteflies but other insects are also getting caught.

### Benefits of pheromone trap use-

#### 1. Pheromone traps are reasonably priced and inexpensive.

Small farms can afford the pheromone trap since it is an inexpensive equipment with low installation and maintenance costs. After installing it once, the only ongoing expense is the price of bait.

#### 2. Intensely insect-specific

An insect species-specific pheromone lure is available. Other kinds and genera of insects won't be drawn into this trap. As a result, it shields an environment from extensive harm.

#### 3. No type of poisons are present

The pheromone lures safeguard both the environment and user health because they are not hazardous to people or other living things.

#### 4. Field installation is simple.

Pheromone traps are devices for one-time installation. They don't take a lot of work or very advanced installation skills to install.

### Pheromone trap limitations

#### 1. Cannot eliminate all bug infestations.

There are just a few types of insect pests for which pheromone lures are available. As a result, it restricts the spectrum of insects that may be controlled by these traps.

#### 2. Ineffective in the event of a rapid bug invasion.

Pheromone traps are less successful at suppressing insect outbreaks than they are at preventing them.

#### 3. Performance varies depending on the weather

The weather affects the lure's ability to attract certain insects. Therefore, on wet or chilly days, some lures might not be very successful.