

## Plastic Bucket Trap Field Survey Guidance



**Figure 1:** Plastic bucket trap (multicolor) deployed in field.

*Photo credit: Nick Furlan, USDA (2025)*

The information contained in this guide can help aid employees with assembling and placing traps in the field, but they should always follow local guidance, pest program guidelines, chemical regulations, and safety precautions.

These guidelines are based on the best information available at the time of development. Email [help@usda.gov](mailto:help@usda.gov) if you need updated information or have questions about the information contained in this document.

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## Introduction

**Plastic bucket traps** are used for monitoring and detecting moth species using specialized lures and insecticide strips. These traps can catch large numbers of moths without causing damage to their identifying features.

Plastic bucket traps, also known as multicolor traps, Unitraps, or Tri-colored bucket traps, are available in different color combinations to suit specific needs. Most PPQ programs use the multicolor trap featuring a green lid, yellow funnel, and white bucket. An all green color combination is also available, as shown in [Appendix A](#).

## Supplies

Trap Supplies Per Bucket Trap	Quantity Calculation	Source
Mesh screen (wet trap)	1 per trap	SSPP*
Sponge (dry trap)	1 per trap	Locally**
Rope and/or metal trap stand	1 per trap	Locally
Pesticide Strip - Large DDVP (Hercon Vaportape II)	1 strip per trap per month of survey***	SSPP
Identification label (PPQ 351 or PPQ 352)	1 per trap	SSPP
Lures	(Refer to Approved Methods Page (AMP) for lure longevity)	SSPP

\*SSPP – Survey Supply Procurement Program

\*\*Purchase locally.

\*\*\*Conservative estimate – environmentally dependent

Additional Supplies*	Quantity Calculation
Wire or string	1 per trap
Writing utensils (pen, pencil, wax pencil, and Sharpie)	2 of each
Ziploc or paper lunch bags (for sample collection)	1 per trap collection
Zip tie or wire ties	Extra supplies for emergencies
Disposable latex/nitrile gloves	1 pair per trap collection
Cooler with reusable ice packs	1 per surveyor
Data Collection sheets (trap cards) or Data Collection Device (iPhone/iPad)	1 per trap or surveyor
Coin Envelope for sample shipments	1 per collection
Pruners for obstructing vegetation	1 pair per surveyor
Hand Cleanser, paper towels, trash bags	Per surveyor

Additional Supplies* (continued)	Quantity Calculation
Safety materials - sunscreen, insect spray, safety vest, identification, and poison ivy wash	Per surveyor

\*Purchase locally.

- [Survey Supply Procurement Program \(SSPP\) \(Appendix B\)](#):  
 Order traps, lures, and accessories through the Survey Supply Ordering System for Priority Pests and PPQ Program Pests. Place orders during the fall open period. If you have questions, please contact the Pest Detection National Operations Manager.
- [Best Practices Ordering SSPP Documents \(Appendix B\)](#):  
 Information on the procedures for ordering survey supplies.

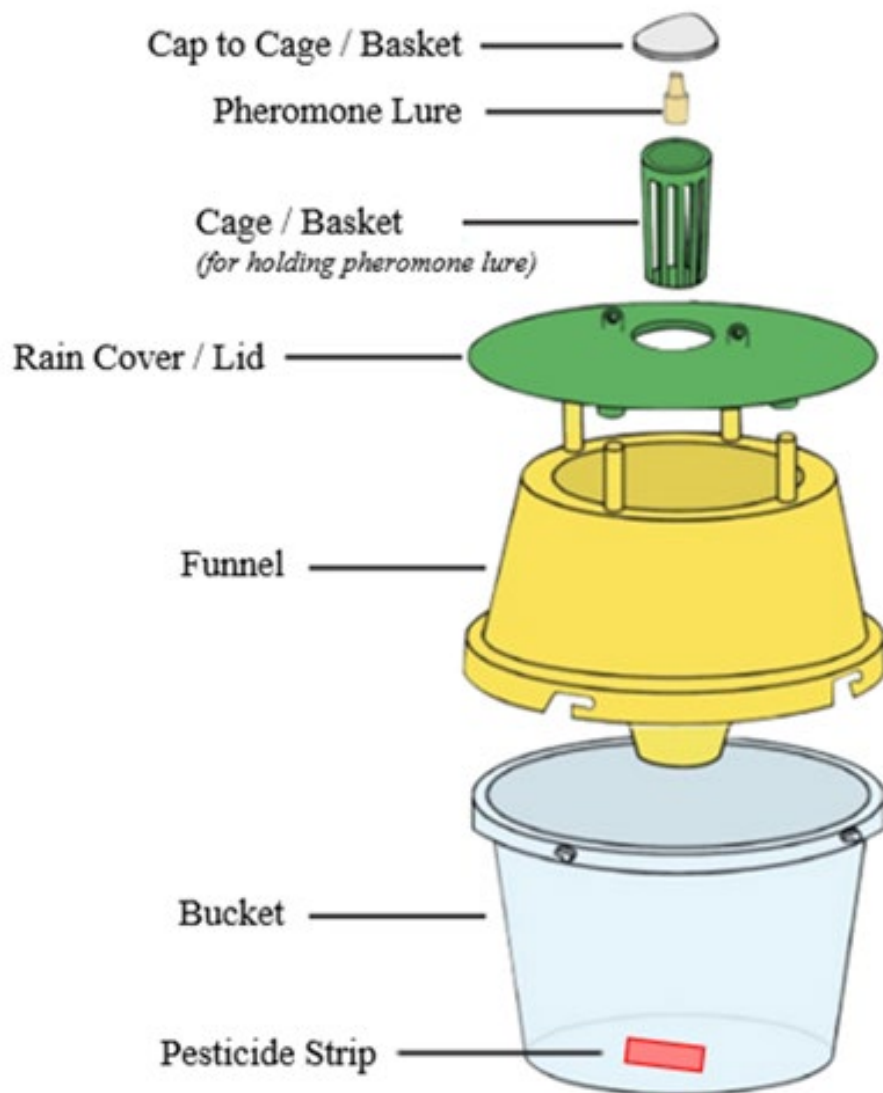
## Safety & Health

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- [Job Hazard Analysis \(JHA\) Library Links from Safety & Health SharePoint Site \(Appendix B\)](#): Refer to local guidance.
- [Lure Safety Data Sheets \(SDS\) \(Appendix B\)](#): Follow all guidance and precautions in SDS.
- [Medical Monitoring for Cholinesterase \(Appendix B\)](#): Employees should be mindful of cholinesterase exposure using pesticide strips.
- [Accident or Incident Reporting Procedures \(Appendix B\)](#)

**Important:** Please read transport and disposal guidance provided in the SDS for all lures and chemicals.

## Survey Preparation



**Figure 2:** Plastic bucket trap (multicolor) components

(Photo credit: modified from FAO 2018). ([Appendix B](#))

**Plastic bucket traps** design includes four essential components: (1) a lid, (2) a lure basket with a cap, (3) a funnel, and (4) a bucket.

## **Trap Assembly & Modification:**

If traps are not already assembled, follow the steps below *before heading to the field*.

### **Step 1:**

Attach lid to funnel by lining up the pegs on the funnel to the holes on the lid. Once aligned, apply pressure so peg is fully inserted in hole (**Figure 3**).

**Important:** Do not try to remove lids once attached, this may lead to breakage.



**Figure 3:** Attach lid to funnel.

*Photo credit: Christopher Pierce, USDA (2025)*

### **Step 2:**

Place the funnel with the attached lid on the plastic bucket so the inserts on the funnel align with pegs on the bucket. Turn funnel clockwise until pegs snap into place (**Figure 4**).



**Figure 4:** Attach funnel to the bucket

*Photo credit: Christopher Pierce, USDA (2025)*

**Step 3:**

Attach cap to lure basket by fitting the cap on the basket and pushing down until you hear a “snap” sound (**Figure 5**).



**Figure 5:** Attach cap to the basket.

*Photo credit: Christopher Pierce, USDA (2025)*

**Step 4:**

Place lure basket in the center of the lid so the cap-end protrudes from the lid. Push down to ensure basket is secure. Lure basket can be secured with tape if needed (**Figure 6**).

**Note:** Lure basket color is not known to affect capture rates and may vary.



**Figure 6:** Secure the basket to the lid.

*Photo credit: Christopher Pierce, USDA (2025)*

**Step 5:**

Attach the wire hanger to the lid by feeding wire ends through the holes on the lid (**Figure 7**). Bend the wire backwards and twist to secure trap to wire (**Figure 8**).





**Figure 7**



**Figure 8**

**Modification:** Rope or string can be used as well (see [Appendix C](#)).

*Photos credit: Christopher Pierce, USDA (2025)*

<p><b>Step 6:</b></p> <p>Affix appropriate labels and warning signage to the trap, following local guidance (<b>Figure 9</b>). Label lure basket cap with lure being used in basket (<b>Figure 10</b>).</p> <p><b>Example:</b> PPQ Form 351, PPQ Form 352, and/or printed notes with waterproof ink with affiliation and contact information.</p>	 <p style="text-align: center;"><b>Figure 9</b></p>	 <p style="text-align: center;"><b>Figure 10</b></p>
<p><i>Photos credit: Charles Baker, USDA (2024)</i></p>		

### **Survey Considerations:**

- **Permission:** Seek permission from the property owner before placing a trap. Ensure the property owner is aware that surveyors will be revisiting the property to monitor and service the trap. If outreach material is available, distribute contact information.
- **Site selection:** Refer to the specific target [Approved Methods \(Appendix A\)](#) and data sheets for guidance on priority pathways and host requirements. Some targets require traps to be placed in, or near preferred hosts to be successful in detection surveys.
- **Trap Placements:** Place traps at sites where other trappers/surveyors can easily access and relocate them.
  - Look for landmarks to note and avoid heavily trafficked areas.
  - If property is gated, ensure that it is accessible during normal working hours.
  - If trap monitoring shows repeated damage, missing traps, or any signs of tampering, select a new site.
  - Utility poles are useful sites for placing traps, as they provide a stable structure, consistent exposure, and are generally free of surrounding vegetation that might obstruct trap access.
  - Hang the trap low enough so surrounding branches or foliage do not block insect access.
  - Trim branches or foliage around the trap and check periodically throughout the season as plants grow.
  - If using a branch, choose a sturdy branch that won't sway excessively in the wind.

- **Storage & Transport of Traps/Lures:** Fully assembled traps are more prone to breakage and will take up more room than disassembled traps when transported.
  - Ensure transport vehicles have enough room for traps and they are packed to prevent damage.
  - Transport lures and pesticide strips in a cooler, do not open individual packaging until in the field.
  - Refrain from transporting lure or Vaportape (including spent units) inside the vehicle compartment with passengers.
  - Store all materials in a locked trunk or lockable truck-bed compartment so they are not accessible when the vehicle is unattended.
  
- **Endangered Species Act, Trapping, and Bycatch** ([Appendix B](#)): Use of plastic bucket traps and their components may be restricted in certain surveys or circumstances under the National Environmental Policy Act (NEPA), the Endangered Species Act (ESA), and/or state or local regulations. Check the CAPS guidance and consult with the program's National Operations Manager in advance to ensure compliance.
  - If concerned about endangered pollinator species and insects, consider using all green plastic bucket traps if option is allowed for specific program ([Appendix A](#)).
  - Do not place bucket traps in locations with active honeybee hives and/or bumble bee colonies. Be especially mindful of agricultural areas where honeybees or bumble bees are used to pollinate crops,
  - Do not place bucket traps in locations where people/entities are actively managing the land to encourage wild, native pollinator communities (e.g. community gardens, organic farms & gardens), and
  - Discontinue surveys at locations where you observe bycatch that is higher than normal in your experience.
  - **Note:** Many variables influence pollinator movement within cropping systems and the environment. It is not a guarantee that following this guidance will prevent or reduce pollinator bycatch.

## Trap Deployment Survey Procedures

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### Trap Installation

Perform all the following steps after the trap is assembled and when located at the deployment site. **Wear gloves when handling chemicals.**

### Lure Attachment Options

#### **Step 1:**

Remove the lure basket from the assembled trap (**Figure 11**).



**Figure 11:** Remove the basket from the funnel.

*Photo credit: Christopher Pierce, USDA (2025)*

#### **Step 2:**

Remove the cap of the lure basket (**Figure 12**).



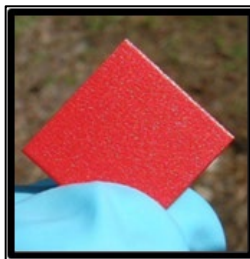
**Figure 12:** Remove cap from the lure basket.

*Photo credit: Christopher Pierce, USDA (2025)*

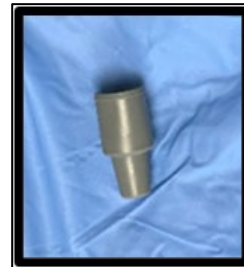
**Step 3:**

Wearing gloves, remove the appropriate lure, laminate (**Figure 13**) or rubber septum (**Figure 14**), from its packaging.

**Important:** Wear gloves to avoid transferring the scent to external areas of the trap to ensure target insects are traveling toward the funnel opening, and avoid transferring scent to other traps.



Laminate Lure  
Figure 13

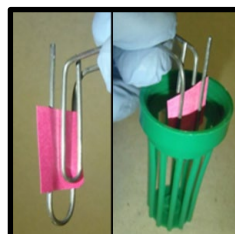


Rubber Septum Lure  
Figure 14

*Photos credit: Christopher Pierce, USDA (2025)*

**Step 4:**

Place the lure in the lure basket. Lure placement will vary depending on the type of lure used. **Laminate lures** can be fixed to a paperclip or mini binder clip then placed within the basket to avoid the lure falling out (**Figure 15**). Place **Rubber septum lures** directly in the basket (**Figure 16**).



Laminate lure  
Figure 15



Rubber septum lure  
Figure 16

*Photos credit: Christopher Pierce, USDA (2025)*

**Step 5:**

Place cap back on lure basket until you hear a “click” (**Figure 17**).



**Figure 17:** Attach lid to lure basket.

*Photo credit: Christopher Pierce, USDA (2025)*

**Step 6:**

Place the lure basket with the lure and cap back in the center of the lid of the trap. Push down until lure basket is secure (**Figure 18**).



**Figure 18:** Attach the lure basket to the funnel.  
*Photo credit: Christopher Pierce, USDA (2025)*

**Step 7:**

Remove the funnel and lid from the bucket by unscrewing the funnel counterclockwise (**Figure 19**).



**Figure 19:** Remove the funnel from the bucket.  
*Photo credit: Christopher Pierce, USDA (2025)*

## **Pesticide Strip Placement**

**Step 8:**

Wearing gloves, remove a pesticide strip from its packaging (**Figure 20**).



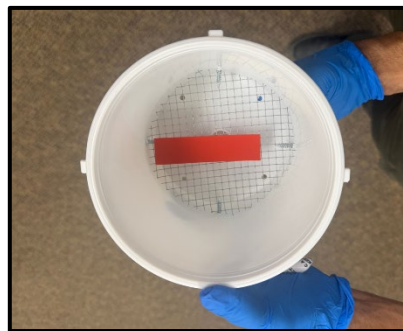
**Figure 20:** Pesticide strip  
*Photo credit: Christopher Pierce, USDA (2025)*

**Important:** Always use gloves and handle pesticide strips in well-ventilated areas. Dispose of packaging and expended strips immediately. Store unopened strips in a freezer without food or drinks. Refer to the SDS for complete safety and handling information.

**Caution:** Pesticides can be injurious to humans, domestic animals, desirable plants, and fish or other wildlife—if they are not handled or applied properly. Use all pesticides selectively and carefully. Follow recommended practices for the disposal of surplus pesticides and pesticide containers. All uses of pesticides must be registered by appropriate state and/or federal agencies before they can be recommended. Lure disposal instructions. Please follow the [SDS guidance](#). ([Appendix B](#))

**Step 9:**

Place the pesticide strip on top of the wire mesh screen inside the bucket portion of the trap (**Figure 21**). This keeps the strip elevated and prevents it from sitting in water.



**Figure 21:** Pesticide strip placement.

*Photo credit: Christopher Pierce, USDA (2026)*

**Step 10:**

Replace funnel and lid on the bucket by screwing the funnel clockwise (**Figure 22**).



**Figure 22:** Attach the funnel to the bucket.

*Photo credit: Christopher Pierce, USDA (2025)*

**Step 11:**

Hang trap by twisting wire hanger around branch or pole (**Figure 23**).



**Figure 23:** Hanging the trap.

*Photo credit: Nick Furlan, USDA (2025)*

## Trap Servicing & Sample Collection

When monitoring or servicing the plastic bucket trap, consult the [Lure Attachment Options](#) or [Pesticide Strip Placement](#) sections if replacement of the lure or pesticide strip is required.

### **Step 1:**

Unscrew the attached lid from the plastic bucket. Rotate the bucket counterclockwise until the pegs disengage from the funnel (**Figure 24**).



**Figure 24:** Opening the trap

*Photo credit: Deanna Parker, USDA (2025)*

### **Step 2:**

In the field, transfer the caught moths to labeled Ziploc or paper sample envelopes (**Figure 25**).



**Figure 25:** Samples collected

*Photo credit: Julieta Brambila, USDA (2010)*

**Step 3:**

Place samples in cooler and transport them back to your duty station. Place samples in a freezer overnight to kill any surviving specimens (**Figure 26**).



**Figure 26:** Cooler for samples

*Photo credit: Julieta Brambila, USDA (2010)*

**Step 4:**

**Important:** When using Ziploc bags, remove wet moth samples as soon as possible after collection and lay them out to dry overnight. Failure to do so may result in specimen deterioration, reducing quality and potentially preventing accurate identification (**Figure 27**). Individuals with allergies or sensitivities should wear a mask while handling and drying samples to avoid exposure to moth scales, mold, or plant debris.



**Figure 27:** Screening samples

*Photo credit: Christopher Pierce, USDA (2025)*

**Important:** If you observe higher than normal bycatch, notify the Pest Detection National Operations Manager. Include the date, crop/survey, trap, lure, survey target species, and bee bycatch counts broken down by honeybee, bumble bee, and other bees.

**Step 5:**

Once dry, store samples locally in a freezer (**Figure 28**) until they are ready to be submitted for diagnostics. For guidance on submitting Lepidoptera samples for identification, please visit: [Specimen submission guidance for Lepidoptera](#) ([Appendix B](#)).



**Figure 28:** Storing samples

*Photo credit: Nick Furlan, USDA (2025)*

## Trap Removal & Storage

After survey season, it is recommended to wash traps with soap and water and allow them to dry completely. When cleaning, pay particular attention to removing moth scales and dirt from the bucket and screen. If you experience issues with lids that are difficult to remove, refer to the [troubleshooting](#) guidance. Traps can be fully disassembled if storage space allows. If storage is limited, trap lids may remain intact. [Instructions on Cleaning and Washing Traps](#) ([Appendix B](#))

**Step 1:**

Store the traps indoors, or at least protected from sun, rain, and dust. The traps can be used for multiple years and for multiple species since the chemicals degrade quickly in outdoor conditions. These traps usually last more than five years (**Figure 29**).



**Figure 29:** Trap storage

*Photo credit: Deanna Parker, USDA (2025)*

**Step 2:**

Keep the wire handle and the wire screen in good condition (**Figure 30**).



**Figure 30:** Wire storage

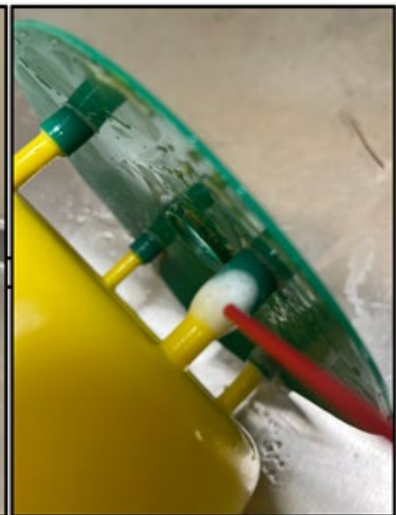
*Photo credit: Deanna Parker, USDA (2025)*

## Troubleshooting

**Difficult to remove parts:** If the lid is difficult to remove (**Figure 31**), spray WD-40 on the pegs and let it sit for about 60 seconds (**Figure 32**). After that, the pegs should come out easily.



**Figure 31**



**Figure 32**

*Photos credit: Deanna Parker, USDA (2025)*

**Difficulty labeling traps:** Use weatherproof labels (**Figure 33**). They do not fade and are easy to remove after the season's over. Allows the ability to customize the labels per survey.



**Figure 33:** Weatherproof labels

*Photo credit: Nick Furlan, USDA (2025)*

**Windy conditions:** To reduce trap movement in windy conditions, zip ties may be used to secure the trap's peg to a metal pole (**Figure 34**). Anchoring the trap helps keep it stable and can improve specimen quality over time.



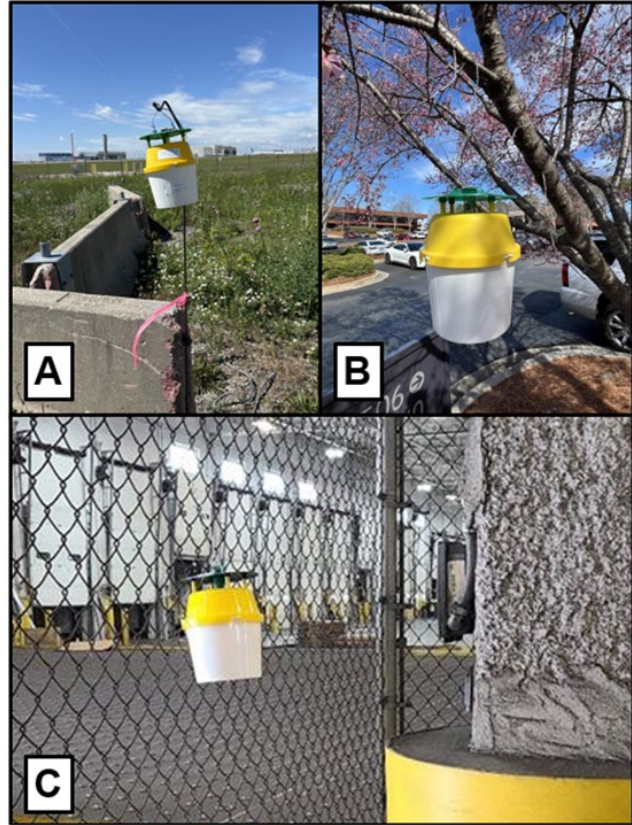
**Figure 34:** Traps in windy conditions

*Photo credit: Christopher Pierce, USDA (2026)*

**Difficult trap conditions:** Be mindful when you place your traps. During dry weather, the ground can be hard, making it difficult to push a metal pole into the soil. When setting up traps in the field, you can use different methods, such as:

- Attaching the plastic bucket trap to a trap stand (**Figure 35A**).
- Hanging the plastic bucket trap from a tree branch (**Figure 35B**).
- Securing the plastic bucket trap to a fence (**Figure 35C**).

*Photos credit: Nick Furlan, USDA (2025)*



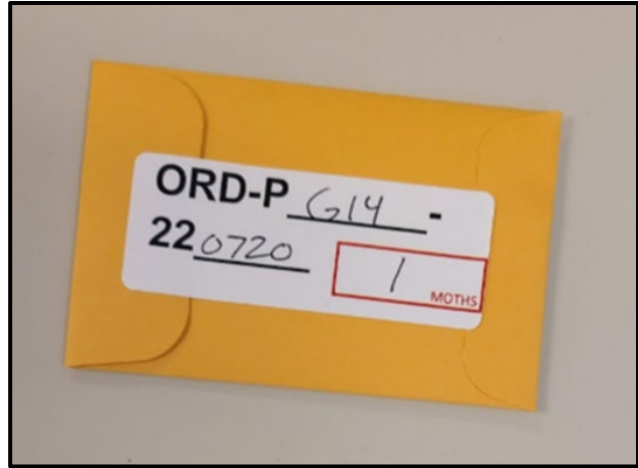
**Animals in traps:** If a small animal gets into your trap (**Figure 36**), empty the trap right away and move it to a new spot. This helps prevent animals from getting inside again.



**Figure 36:** Animals in traps

*Photo credit: Alyssa Wendt, USDA (2025)*

**Labeling sample envelopes:** Print blank labels that are easy to write on and use them to seal the envelopes (Figure 37).



**Figure 37:** Labeling sampling envelopes

*Photo credit: Nick Furlan, USDA (2025)*

## Appendix A: Plastic Bucket Trap Color Variations



**Figure 38:** Multicolor trap (left) and all green plastic bucket traps (right).

Photo credit: Christopher Pierce, USDA (2025)

Approved Methods for Pest Surveillance		
Pest	Multicolor Bucket Trap	All Green Trap
Silver Y moth, <i>Autographa gamma</i>	X	X
Golden twin spot moth, <i>Chrysodeixis chalcites</i>	X	X
Christmas berry webworm, <i>Cryptoblabes gnidiella</i>	X	X
Box tree moth, <i>Cydalima perspectalis</i>	X	X
Old World bollworm, <i>Helicoverpa armigera</i>	X	X
Pine beauty moth, <i>Panolis flammea</i>	X	X
Cotton cutworm, <i>Spodoptera litura</i>	X	X

**Important:** Multicolor bucket traps are known to be more attractive to native bees and are a major source of pollinator “bycatch”. All green plastic bucket traps are purposely selected to cut down on the accidental capture of foraging bumblebees and other pollinators, as these colors are less visible to them.

## Appendix B: References and Resources

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Food and Agriculture Organization of the United Nations (FAO) (2018) Integrated management of the Fall Armyworm on maize: A guide for Farmer Field Schools in Africa. Rome, 119pp.

Survey Supply Procurement Program (SSPP)	<a href="https://caps.ceris.purdue.edu/survey-supplies/">https://caps.ceris.purdue.edu/survey-supplies/</a>
Best Practices Ordering SSPP Documents	<a href="https://caps.ceris.purdue.edu/survey-supplies/">https://caps.ceris.purdue.edu/survey-supplies/</a>
Job Hazard Analysis (JHA) Library Links from Safety & Health SharePoint Site ( <b>PPQ Only</b> )	<a href="https://usdagcc.sharepoint.com/sites/aphis-ppq-fldops/safehealth/">https://usdagcc.sharepoint.com/sites/aphis-ppq-fldops/safehealth/</a>
Lure Safety Data Sheets	<a href="https://caps.ceris.purdue.edu/survey-supplies/">https://caps.ceris.purdue.edu/survey-supplies/</a>
Medical Monitoring for Cholinesterase ( <b>PPQ Only</b> )	<a href="https://usdagcc.sharepoint.com/sites/aphis-ppq-fldops/safehealth/SitePages/APHIS-29-Medical-Monitoring.aspx">https://usdagcc.sharepoint.com/sites/aphis-ppq-fldops/safehealth/SitePages/APHIS-29-Medical-Monitoring.aspx</a>
Approved Methods	<a href="https://approvedmethods.ceris.purdue.edu/pests">https://approvedmethods.ceris.purdue.edu/pests</a>
Endangered Species Act, Trapping, and Bycatch	<a href="https://caps.ceris.purdue.edu/esa/">https://caps.ceris.purdue.edu/esa/</a>
Specimen Submission Guidance for Lepidoptera	<a href="https://caps.ceris.purdue.edu/wp-content/uploads/2025/07/Domestic-Sample-Submission-Instructions-for-Lepidoptera-2025.pdf">https://caps.ceris.purdue.edu/wp-content/uploads/2025/07/Domestic-Sample-Submission-Instructions-for-Lepidoptera-2025.pdf</a>
Instructions on Cleaning and Washing Traps ( <b>PPQ Only</b> )	<a href="https://usdagcc.sharepoint.com/sites/aphis-ppq-fldops/safehealth/">https://usdagcc.sharepoint.com/sites/aphis-ppq-fldops/safehealth/</a>
SDS guidance	<a href="https://caps.ceris.purdue.edu/survey-supplies/">https://caps.ceris.purdue.edu/survey-supplies/</a>
Accident or Incident Reporting Procedures ( <b>PPQ Only</b> )	<a href="https://usdagcc.sharepoint.com/sites/aphis-ppq-fldops/safehealth/SitePages/Accident-Incident-Reporting-Procedures.aspx">https://usdagcc.sharepoint.com/sites/aphis-ppq-fldops/safehealth/SitePages/Accident-Incident-Reporting-Procedures.aspx</a>

## Appendix C: Plastic Bucket Trap Modifications

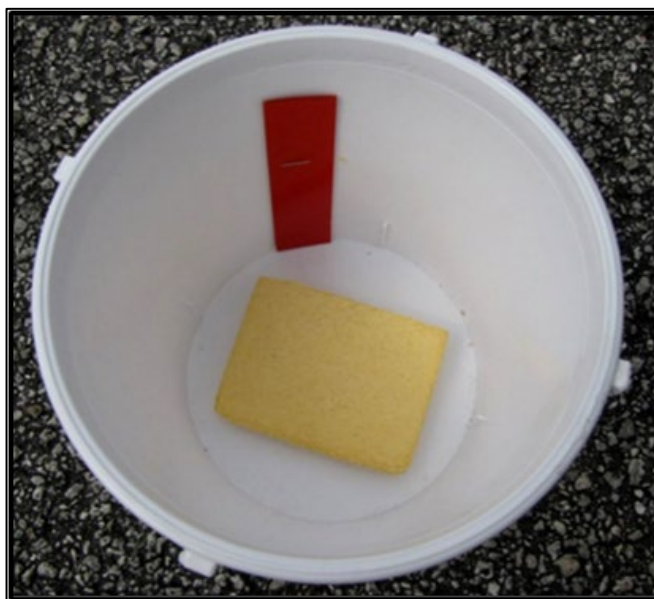
### Methods for Preventing Rain from Damaging Samples

There are two trap modifications that may be used to improve moth specimen quality. Surveyors are encouraged to use whichever method provides the highest quality moth specimens in their state's climate.

If dry conditions (Method 1)	Use sponge modification
If wet conditions (Method 2)	Use drain holes and wire mesh screen modification

### Method 1 – Dry Conditions (Sponge):

Place a dry cellulose sponge in the bottom of the trap (**Figure 39**). The sponge absorbs excess moisture during rain and helps keep captured moths dry. Sponges should be purchased locally and must be free of additives such as fragrances, antibacterial agents, or other chemicals.



**Figure 39:** Plastic bucket trap with sponge (yellow) and insecticide strip (red)

*Photo credit: Christopher Pierce, USDA (2025)*

## Method 2 – Wet Conditions (Drain holes and wire mesh screen):

### Step 1:

Use a 3/16-inch drill bit to drill 4 to 5 holes in the bottom of the bucket to allow excess rainwater to drain (**Figure 40**). Drill holes around the outer edge of the bucket to allow for proper drainage, not in the concave part of the bottom. Drill the holes from inside the trap to outside.



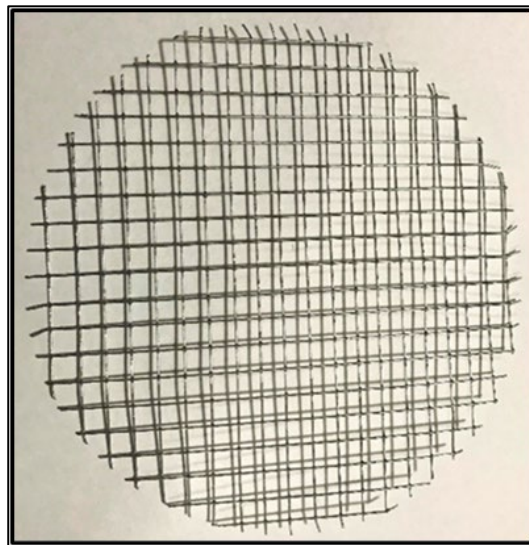
**Figure 40:** Plastic bucket trap with drilled holes (see red arrow)

*Photo credit: Christopher Pierce, USDA (2025)*

### Step 2:

Place the wire mesh screen on the protruding screws inside the bucket (**Figure 41**). This keeps specimens elevated above any pooled water.

Elevation matters because it prevents specimens from sitting in standing water, which can cause them to decay, discolor, or become too fragile to identify. By keeping them above pooled water, the sample stays cleaner, drier, and in better condition for examination.



**Figure 41:** Wire mesh screen

*Photo credit: Christopher Pierce, USDA (2025)*

**Step 3:**

Drill four #8 x 3/4 inch machine screws placed equidistant around the trap and 1-inch from the bottom of the plastic bucket (**Figure 42**). (Pro-tip: Use the small tabs on the inside of the bucket as a guide for placing screws 1-inch from bottom).

The screws enable easier removal of the wire mesh for collecting specimens underneath on the bottom of the bucket.



**Figure 42:** Screw placement for mesh screen  
*Photo credit: Christopher Pierce, USDA (2025)*

Alternate hanging option:

If wire isn't available, use rope. Feed it through the two top holes in the lid (**Figure 43**), then use the extra rope to secure the trap to a pole or branch (**Figure 44**).



**Figure 43**



**Figure 44**

*Photos credit: Christopher Pierce, USDA (2026)*



## Appendix D: Acknowledgments

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This protocol has been designed to aid in the detection of exotic moths of concern by giving instructions on how to use the plastic bucket traps. Thank you to Nichole Carrier, Nick Furlan, Deanna Parker, Brianna Flonc, Alec Ormsby, and Christopher Pierce. This revision was based on the work by Julieta Brambila, Lisa Jackson, and Robert L. Meagher in 2010. Revisions were made by Julieta Brambila, Lisa Jackson, Douglas Restom Gaskill, Andrew Derksen, and Robert L. Meagher in 2014. Revisions to that document occurred in 2021 by Heather Moylett, Todd Gilligan, and Christopher Pierce and were reviewed by Mark Hollister.