

PROGRAM: Asian Citrus Psyllid (ACP) Trapping

TYPE OF TRAP: Yellow Panel Trap

The yellow panel trap (Figs. 1-2) is a yellow two-sided sticky board. Insects are caught on the sticky capture surface.



FIGURE 1. YELLOW PANEL TRAP

ATTRACTANT: For ACP, the only attractant of the yellow panel trap is the color (see table below).

Trap Component	Stimulus	Response
Yellow trap body	Foliar mimic	Feeding and ovipositional

TRAPPING SEASON: The trapping protocol is subject to change. Consult with your detection entomologist and the Asian Citrus Psyllid Trapping Guidelines.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

TRAP DENSITY: The trapping protocol is subject to change. Consult with your detection entomologist and the Asian Citrus Psyllid Trapping Guidelines.

Delimitation Survey - Place 100 traps in the core square mile and 50 traps per square mile in the surrounding 8 square miles (first buffer).

INSPECTION FREQUENCY: The trapping protocol is subject to change. Consult with your detection entomologist and the Asian Citrus Psyllid Trapping Guidelines.

HOSTS: The yellow panel trap is a general purpose trap for the detection of a wide variety of insects. For ACP, only citrus and citrus relatives will be trapped. Citrus relatives include kumquat, orange jasmine, curry leaf and murraya.

SELECTION OF TRAPPING SITES: Selection of a trap site will depend on two main criteria. First priority is a suitable host. Second, the host should also meet the conditions for trap placement as described under "Hanging the Trap." Assuming uniform host distribution, then uniform trap distribution should also be achieved. Good host selection takes precedence over trap distribution.

HANGING THE TRAP: Place traps in the upper 1/2 of the tree canopy, at the outer ends of the branches. Maintain an open space around the trap so that both sides of the trap are functional (Figs. 1 & 2). Traps should never be hung below the foliage canopy. Place the trap in the tree where it will be in the sun most of the day. Do not place the trap in the shaded parts of the tree. Use the south (preferable), east or west sides of trees.

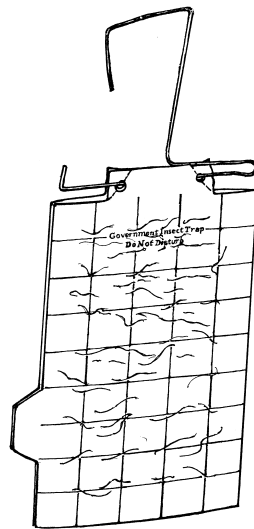


FIGURE 2. HANGING SYSTEM FOR YELLOW PANEL TRAP

TRAP INSPECTION AND SERVICING: Replace traps monthly. Number, date, and initial the trap on the white backside when placing. Note servicing dates on the outside non-sticky margins of the trap. Inspect traps for ACP infestations before submitting the trap for closer inspection. Bend the white tabs on the sides of the trap then fold the trap closed (yellow sticky surface inside). Secure the tabs with a paperclip to prevent the sticky surfaces from touching.

COLLECTION AND SUBMISSION OF SAMPLES: All traps will be submitted to a trapping supervisor for closer inspection at a designated ACP screening facility. Each trap should be accompanied by a completed submission form 60-222 (Fig. 3) (note that this is not the PDR form). A Standard Form 65-020, "Pest and Damage Record" (PDR), will be required when sending a suspect specimen to the lab for identification. Be sure specimens are marked "RUSH," both on the identification slip and on the outside of the package. Include the trap number in the "Remarks" section of the PDR Form.

State of California -- Department of Food and Agriculture Plant Health and Pest Prevention Services		
PEST DETECTION/EMERGENCY PROJECTS		
PROJECT PEST SUBMISSION FORM		
Trap #:	Date:	Time collected:
Address:		
City:	County:	
Cross street:	Last service date:	
Collector (First and last name):	Trap type:	Number of samples:
Affiliation: F <input type="checkbox"/> S <input type="checkbox"/> C <input type="checkbox"/> E <input type="checkbox"/> U <input type="checkbox"/> O <input type="checkbox"/> (describe other)	Trap density: per	
Latitude:	Condition: Dead <input type="checkbox"/> Alive <input type="checkbox"/>	
Longitude:	Host:	
60-222 (11/09)		

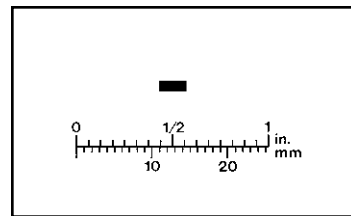
FIGURE 3. PEST SUBMISSION FORM

BAITING INTERVAL: Replace the entire trap monthly. Replace excessively dirty traps every two weeks.

TRAP RELOCATION: Relocate as necessary to maintain this trap in a host tree.



Photos taken by Michael Rogers, University of Florida



**ASIAN CITRUS
PSYLLID**
Diaphorina citri (Kuwayama)

PROGRAM: All Purpose Fruit Fly Trapping

TYPE OF TRAP: Pherocon AM™ (Adult Monitoring)

The Pherocon AM™ trap (Fig. 1) is a yellow two-sided sticky board with odor attractants incorporated into the stickum. Flies are caught on the sticky capture surface.



FIGURE 1. PHEROCON AM™ TRAP

ATTRACTANTS: There are two attractant components utilized in the Pherocon AM™ trap (see table below).

Trap Component	Stimulus	Response
Stickum	Ammonium acetate Protein hydrolysate	Feeding
Yellow trap body	Foliar mimic	Feeding and ovipositional

TRAPPING SEASON: Subject to host availability, full deployment should be accomplished by May 1. Traps should be removed during the first servicing after October 31.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

TRAP DENSITY: Detection Survey - Three traps per square mile in urban areas. Selected residences, up to three, in rural residential areas of 300 or more homes per square mile. Trapping to be conducted in those counties as approved in the state/county detection trapping contract.

Delimitation Survey - Within 24 hours of the initial find, place 100 traps in host trees (one trap per tree) in a one-square-mile area surrounding the initial find. If 100 trees cannot be located, use as many as are available.

INSPECTION FREQUENCY: Detection Survey - Inspect traps every two weeks.

Delimitation Survey - Inspect traps daily until determined otherwise.

HOSTS: The Pherocon AM trap is a general purpose trap for the detection of a wide variety of adult fruit flies. Any type of fruit tree with ripe or nearly ripe fruit can be used. However, traps should not be placed in citrus trees for convenience and maintained on a year-round basis. Relocate traps into different hosts throughout the growing season.

SELECTION OF TRAPPING SITES: Selection of a trap site will depend on two main criteria. First and foremost will be a suitable host. Second, it should also meet the conditions for trap placement as described under "Hanging the Trap." Assuming uniform host distribution, then uniform trap distribution should also be achieved. Good host selection should take precedence over trap distribution, within the subdivisions of a square mile. See the section for Medfly trapping under "Trap Density" for a suggested method for subdividing a square mile.

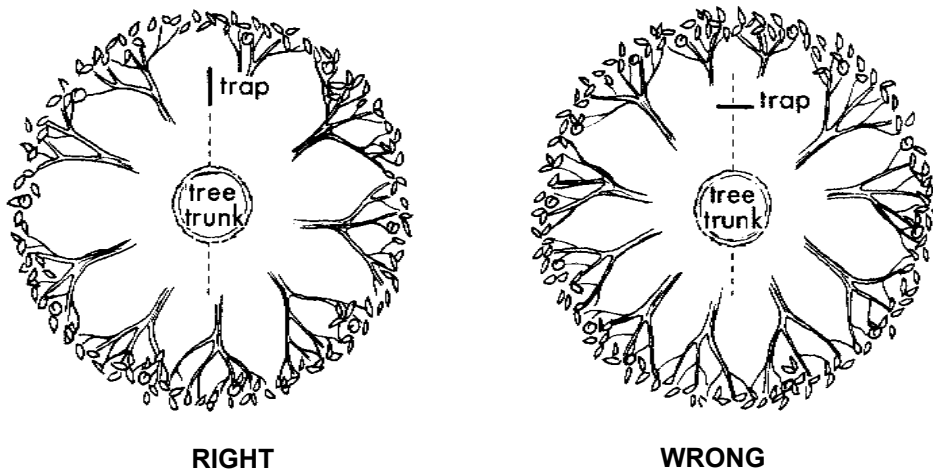
Special Considerations: At a high trap density, some areas may have a limited number of host trees with fruit. When this occurs, consideration should be given to placing the trap in a host tree with foliage and evidence of **abundant honeydew**. Honeydew is a sweetish, clear excretion produced by certain insects such as aphids, scale insects, mealybugs, and whiteflies. When present, it usually accumulates on the foliage and is a good food source for adult fruit flies. The presence of black sooty mold on the foliage indicates honeydew is present.

HANGING THE TRAP: Traps should be placed in the upper 1/2 to 1/3 of the tree canopy, about two feet from the outer ends of the branches. Maintain a space of 12 inches to 18 inches around the trap; foliage and ripening fruit should surround the trap beyond that distance, particularly to the bottom and sides. Traps should never be hung below the foliage canopy, nor should they be closer than four feet to the ground.

Be sure the trap is visible in filtered sunlight. Direct sun is acceptable as long as the other criteria for placement are met. Use the south (preferable), east or west sides of trees. In extremely hot areas, traps should be rotated to the north side during the hotter months.

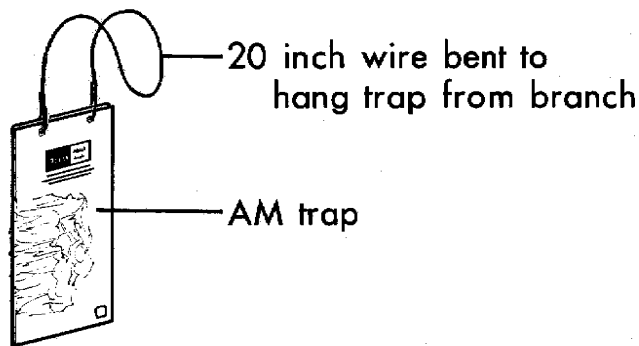
Position the trap so that a horizontal line parallel to the sticky surfaces intersects the trunk of the tree (Fig. 2). Secure the trap to prevent it from twisting out of position. The best method to use is illustrated in Figure 3. Put a hole in each corner at the top of the trap. Form a loop with a 20-inch piece of wire and attach the two ends to the trap.

FIGURE 2. TRAP POSITION WITHIN THE TREE AS SEEN FROM ABOVE



Bend the wire as illustrated to hang on a branch. If this method is not practical, then other suggested methods are: (a) hang the trap from a branch with a wire through the center hole in the top of the trap, and secure the trap to a lower branch with a wire through the hole at the lower corner of the trap, or (b) punch a hole in each corner at the top of the trap and use two wires to suspend the trap from a branch. Do not attach any objects to the trap that can move and act as a deterrent.

FIGURE 3. HANGING SYSTEM FOR AM TRAP



TRAP INSPECTION AND SERVICING: Replace traps every four weeks (sooner if excessively cluttered or dirty). Number and date the trap on the white backside when placing. Service dates can be noted on the yellow edges. Inspect traps carefully as target flies may be easily concealed by other trapped insects and debris. The wings of the target flies may also be folded in the stickum making observation difficult.

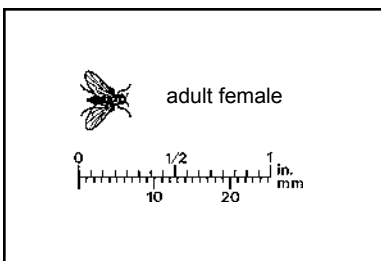
COLLECTION AND SUBMISSION OF SAMPLES: Traps with suspect flies should be removed and partially folded with sticky surfaces to the inside, and a rubber band placed around the outside to hold position. Use a Standard Form 65-020, "Pest and Damage Record" (PDR), when sending specimens for identification. Be sure specimens are marked "RUSH," both on the identification slip and on the outside of the package. Include the trap number in the "Entomology" section of the PDR Form.

BAITING INTERVAL: Replace the entire trap every four weeks. Excessively dirty traps may be replaced every two weeks.

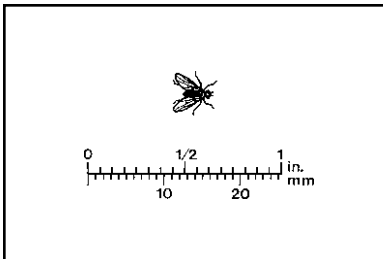
TRAP RELOCATION: Relocate as necessary to maintain this trap in a host tree with mature or nearly mature fruit. If a desired fruiting host tree cannot be located, either because of lack of hosts, or lateness of the season, then a trap should not be placed or maintained. This may mean that certain square miles may have fewer traps than the proposed level.



Photo courtesy of Cornell University Agricultural Experiment Station



APPLE MAGGOT
Rhagoletis pomonella (Walsh)



Western Cherry Fruit Fly
Rhagoletis indifferens Curran

PROGRAM: Boll Weevil Trapping

TYPE OF TRAP: Boll Weevil Scout™

The Boll Weevil Scout™ trap (Fig. 1) consists of three parts: the trap body, molded screen cone, and plastic collection chamber. Weevils attracted to the trap enter the collection chamber through the opening at the top of the molded screen cone.



FIGURE 1. BOLL WEEVIL SCOUT™ TRAP

ATTRACTANTS: 30 mg Grandlure - an artificial aggregation pheromone contained in an yellow wafer (“lure tape”), which attracts male as well as female weevils.

Trap Color - the Saturn yellow trap body is an important foliar mimic.

Insecticide - a red Hercon® Vaportape™ II insecticide strip is placed with the “lure tape” in the collection chamber. The active ingredient is 10% 2, 2-Dichlorovinyl dimethyl phosphate.

TRAPPING SEASON: From planting date, with full deployment by March 15, through plowdown, no later than December 20.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Note: Least likely period for trapping weevils is June through August.

TRAP DENSITY: Detection Survey - Use one trap for every 640 acres of planted cotton. Place additional traps at high-probability locations, i.e., gins, trucking companies, pathways, etc.

Delimitation Survey - Delimitation trapping is conducted following confirmation of a boll weevil collection. Trap density will be increased within 48 hours to one trap per five acres, up to 128 traps in the core square mile. In a one mile buffer surrounding the core mile, traps will be increased to one trap per 40 acres, up to 16 traps per square mile. All traps should be placed around the perimeter of cotton fields, not in the fields.

BOLL WEEVIL DELIMITATION TRAPPING

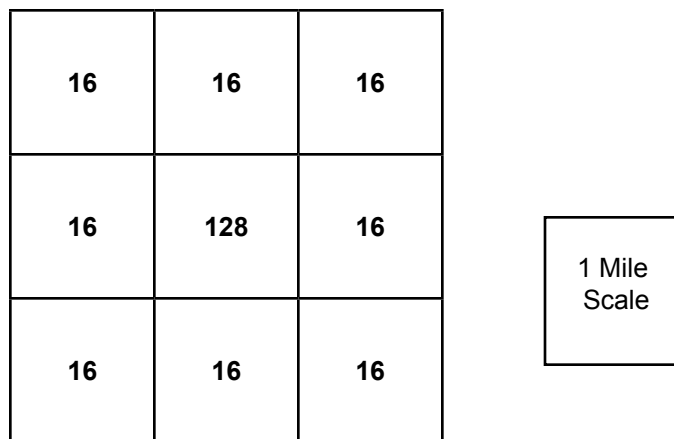


FIGURE 2.

INSPECTION FREQUENCY: Detection Survey - Traps are to be serviced monthly after plant emergence through plowdown.

Delimitation Survey - Traps in the core square mile will be checked daily during the first week and weekly thereafter. Buffer area traps will be checked as often as determined by project management.

HOST: Cotton

SELECTION OF TRAPPING SITES: Traps should be placed on the perimeter of a cotton field. The trap works most effectively when it is visible from all directions. Placing the trap close to utility poles, standpipes, and tall weeds will lower the trap's effectiveness. Select trap sites carefully to avoid accidental damage or vandalism. Establish and maintain good geographical distribution. Avoid the tendency to concentrate traps along routes of convenient travel.

During the winter months, after the cotton has been shredded, the traps may need to be removed or relocated to areas that will provide shelter and moisture for adult beetles. Shelter can be provided by boards, haystacks, weedy ditch banks, brush, etc. This is particularly true for 640 acre parcels.

Early in the spring, as soon as the young cotton plants begin appearing, traps should be moved back to the vicinity of a cotton field.

HANGING THE TRAP: Traps are to be placed on the top of stakes. They can be stapled on the stake (Fig. 3), set on a nail (Fig. 4), or inserted in a slit cut in the end of the stake (Fig. 5).



FIGURE 3. STAPLED

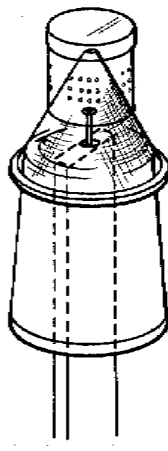


FIGURE 4. NAILED

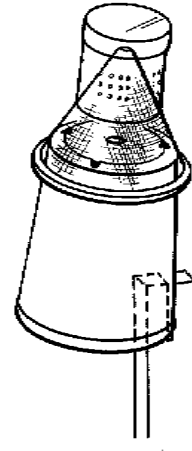


FIGURE 5. SLOTTED

Insert one pheromone wafer and one insecticide strip into the clear collection chamber on the top of the trap (Fig. 6). The pesticide strip can be attached to the inside of the lid on the collection chamber with an adhesive, i.e., rubber cement. This assures contact with the insecticide since weevils crawl around on the lid after entering the collection chamber. Also, in this location the wafer does not interfere with airflow through the screen cone. Replace the lid. Do not handle the pheromone or insecticide with your fingers, use forceps. Dispose of all used trapping materials at the office, not in the field.

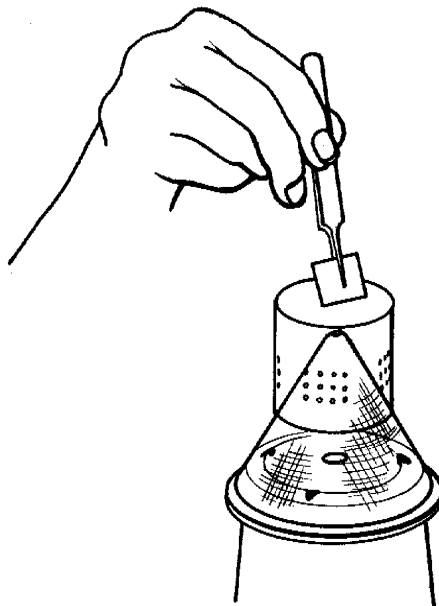


FIGURE 6.

TRAP INSPECTION AND SERVICING: The stake and the underside of the trap should be inspected before touching the trap. Weevils will often rest on the stake or crawl up on the inside of the trap body. After inspecting the stake, and underside of the trap, proceed with the inspection of the clear plastic collector. The pheromone wafer and insecticide strip can also conceal weevils. A complete inspection of the trap can be made by removing the plastic lid of the collector and looking under the wafer and insecticide strip. When inspecting or baiting the boll weevil trap, the pheromone and insecticide strip should be handled with forceps. When inspection of the collection chamber is completed, clean out spider webs, etc., and replace the collector lid. Date the trap on the inner surface of the trap body at each inspection. Return the used pheromone and pesticide strips to the office for proper disposal.

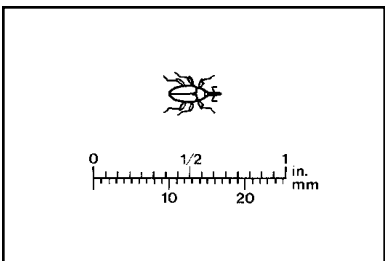
COLLECTION AND SUBMISSION OF SAMPLES: DEAD weevils found during the trap inspection are to be placed in a dry vial, using tissue to protect them from damage, and submitted to the Sacramento lab for identification. LIVE weevils should be placed in alcohol and shipped according to instructions listed on page xiv. Picking up active weevils from the collection chamber with your fingers is cumbersome and may result in their escape; use forceps. Use a Standard Form 65-020, "Pest and Damage Record" (PDR) when sending specimens for identification. Be sure specimens are marked "RUSH," both on the identification slip, and on the outside of the package. Include the trap number in the "Entomology" section of the PDR Form.

BAITING INTERVAL: Change the "lure tape" every month. The insecticide strip is to be replaced about every three months (this may vary depending upon climatic conditions).

TRAP RELOCATIONS: A trap can be left at one location as long as the field remains in cotton production. However, at the start of a new growing season, some traps will need to be relocated to accommodate changes in cotton plantings. Vandalism, damage, or missing traps would suggest moving the trap to a different location.



Photo by Jack Clark, University of California Agriculture and Natural Resources



BOLL WEEVIL

Anthonomus grandis grandis Boheman

PROGRAM: General Fruit Fly Trapping

TYPE OF TRAP: ChamP™ Trap

The ChamP™ trap (Fig.1) is a hollow, yellow panel trap with two perforated sticky sides. When folded, the trap is rectangular in shape (7" long, 6" wide), resembling a large tea bag. A food attractant is placed in the center of the trap and is dispersed through the elongate holes in the side panels.

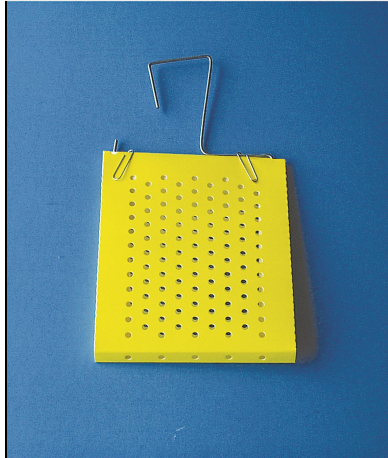


FIGURE 1. - CHAMP™ TRAP

ATTRACTANTS: Ammonium bicarbonate and yellow color (see table below).

Trap Component	Stimulus	Response
Food packet	Ammonium bicarbonate	Feeding
Yellow trap body	Foliar mimic	Feeding and ovipositional

TRAPPING SEASON: Southern California (in part) - Year-round in rural areas of Los Angeles, Orange, San Diego, western Riverside, and western San Bernardino counties.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Southern San Francisco Bay Area and that part of Southern California not trapping year-round - April through November. Subject to host availability, full deployment in rural areas should be accomplished by April 1. Traps should be removed during the first servicing after November 30.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Other Urban Areas - May through October. Subject to host availability, full deployment in all areas should be accomplished by May 1. Traps should be removed during the first servicing after October 31.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Imperial County - November through May. Subject to host availability, full deployment in rural areas should be accomplished by November 1. Traps should be removed during the first servicing after May 31.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Coachella Valley - September through June. Subject to host availability, full deployment in rural areas should be accomplished by September 1. Traps should be removed during the first servicing after June 30.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

TRAP DENSITY: Detection Survey - For the counties using ChamP™ traps in urban areas (see page xxxiii), use two traps per square mile in urban areas (the counties of Fresno, Kings, San Joaquin, Santa Cruz, and Tulare will use some ChamP™ traps in lieu of a McPhail trap in some rural residential areas). Use one trap per six square miles in rural areas.

Delimitation Survey - See “Delimitation Survey” sections for the appropriate fruit fly.

INSPECTION FREQUENCY: Detection Survey - Once every 14 days for urban trapping and once per month for rural trapping.

Delimitation Survey - See “Inspection Frequency” for the appropriate fruit fly.

HOSTS: The selection of the best host at each trap location is the most important phase of an effective detection program. Priority must be given to hosts listed in the Host Preference List.

General Fruit Fly Host Preference List

Primary hosts are vegetables; fruit trees are secondary hosts.

- Cucurbits (melons, squashes, cucumbers, pumpkins, gourds, etc.)
- Tomatoes
- Green beans
- Peppers
- Okra
- Eggplant
- Stone fruits
- Pome fruits
- Tropical fruits
- Citrus

For all *Anastrepha* spp., *Bactrocera* spp., and *Dacus* spp. and fruit flies in general, fruit trees are acceptable for trapping when none of the above vegetable hosts are available.

SELECTION OF TRAPPING SITES: The two ChamP™ traps per square mile deployed for general fruit fly detection must be placed near primary hosts in the general fruit fly host preference list. ChamP™ traps deployed in or near gardens for general fruit fly detection can utilize non-fruit trees to keep the trap as close as possible to the garden.

Special Considerations: At a high trap density, some areas may have a limited number of host trees with fruit. When this occurs, consideration should be given to placing the trap in a host tree with foliage and evidence of **abundant honeydew**. Honeydew is a sweetish, clear excretion produced by certain insects such as aphids, scale insects, mealybugs, and whiteflies. When present, it usually accumulates on the foliage and is a good food source for adult fruit flies. The presence of black sooty mold on the foliage indicates honeydew is present.

Maintain a uniform trap distribution. This can be achieved by alternating trap placement from the north/south subgrids in one mile to the east/west subgrid in the adjoining mile. Repeat this pattern over the entire trapping area (Fig. 2). However, host availability will always determine trap location.

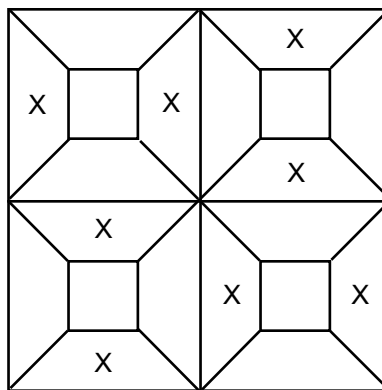


FIGURE 2.

HANGING THE TRAP: Traps should be placed in the upper 1/2 to 1/3 of the tree canopy, about two feet from the outer ends of the branches. Maintain a space of 12 inches to 18 inches around the trap; foliage and ripening fruit should surround the trap beyond that distance, particularly to the bottom and sides. Traps should never be hung below the foliage canopy, nor should they be closer than four feet to the ground.

Be sure the trap is visible in filtered sunlight. Direct sun is acceptable as long as the other criteria for placement are met. Use the south (preferable), east or west sides of trees. In extremely hot areas, traps should be rotated to the north side during the hotter months. Position the trap so that a horizontal line parallel to the sticky surfaces intersects the trunk of the tree (Fig. 3).

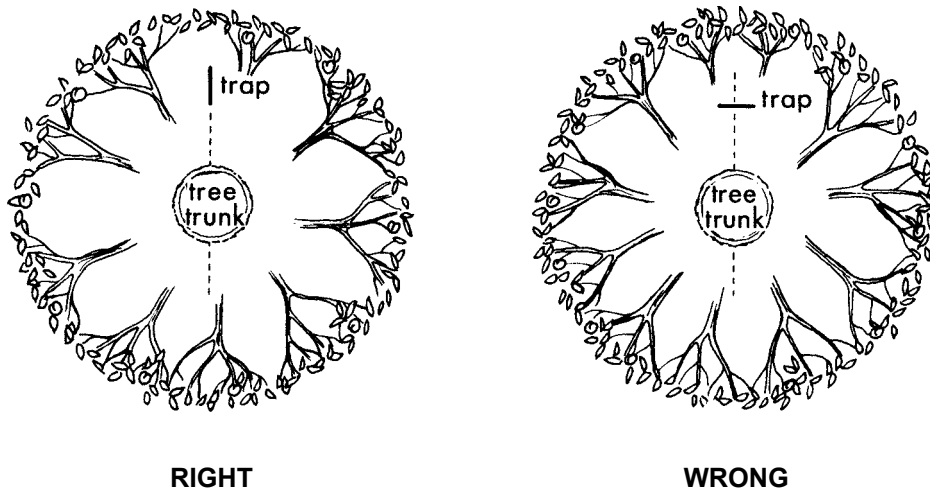


FIGURE 3. - TRAP POSITION WITHIN THE TREE AS SEEN FROM ABOVE

TRAP INSPECTION AND SERVICING: Replace the ChamP™ trap every six weeks or more frequently if the sticky surfaces are excessively dirty. Rural traps will be replaced every month when relocated. Write the trap number and deployment date on the top fold at the time of deployment. Also, date each lure packet when placed in the field. Inspect traps carefully as target flies may be easily concealed by other trapped insects and debris or may be difficult to recognize because distinguishing features such as wing patterns and body coloration may be obscured by the adhesive. Since the ChamP™ trap is equivalent to a Jackson trap insert, it must be replaced whenever the trap is relocated.

COLLECTION AND SUBMISSION OF SAMPLES: When collecting samples for identification, take the following steps:

1. Pull open the tear strip along the folded flap at the top of the trap. Remove the trap hanger and the attractant. Invert the trap so that the sticky sides are facing inward, but not touching. Refold the top flap and hold it in place with a paper clip or rubber band. This will secure the trap in an inside-out position and prevent damage to any insects caught in the adhesive.
2. Place the trap in a #4 paper bag or zip shut plastic bag. Staple or include the Standard Form 65-020, "Pest and Damage Record" (PDR) or equivalent "Project Submission Form" to the outside of the bag. Specimens submitted to Sacramento may be cut from the sticky insert and placed in a dry vial for submission. Be sure the identification slip and the outside of the package are marked "Rush." Include the trap number in the "Entomology" section of the PDR Form.

BAITING INTERVAL: The ammonium bicarbonate pouch will last up to one month (4 weeks). In urban situations, the ammonium bicarbonate pouches should be replaced at each servicing (every two weeks).

TRAP RELOCATION: Relocate every six weeks to a new site at least 500 feet away. When relocation sites are limited, traps can remain longer than six weeks as long as fruit is available at the trap site. Relocations should provide for moving the trap throughout its assigned area during the course of the trapping season. Traps deployed for rural trapping will be relocated every month.

ChamP™ traps deployed at garden sites with melon fly traps will relocate on the melon fly trap relocation schedule. Prior to the deployment of and subsequent to the removal of melon fly traps, these traps will be relocated on a six-week schedule. When the season for garden host plants has passed these traps are to be deployed in fruit trees with fruit.

PROGRAM: European Corn Borer (EC) Trapping

TYPE OF TRAP: Pherocon 1C™

The Pherocon 1C™ trap (Fig. 1) is a cardboard trap with a non-sticky top and replaceable bottom coated with stickum. A rubber cap impregnated with EC pheromone attracts male moths onto the sticky capture surface.



FIGURE 1. PHEROCON 1C™ TRAP

ATTRACTANT: A synthetic sex pheromone, 97% (Z)-11-tetradecenyl acetate and 3% (E)-11-tetradecenyl acetate.

TRAPPING SEASON: Traps are to be deployed prior to April 1 and removed after September 30.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

TRAP DENSITY: Use one trap per high-hazard location, i.e., mills or feed lots receiving grain from EC infested areas. (Infested areas of the U.S. are generally east of the Rocky Mountains). For larger facilities, use two or more traps located on opposite sides of the facility. Extra traps can be used in high density urban areas.

INSPECTION FREQUENCY: Traps are to be inspected every two weeks. Inspect at least weekly for delimitation or intensive survey.

HOSTS: EC is primarily considered a pest of corn. However, it is known to attack nearly every herbaceous plant large enough for the larvae to enter. Commonly reported hosts include: corn, dahlia, barnyard grass, pigweed, ragweed, chrysanthemum, gladiolus, potato, oat, green bean, rhubarb, hemp, lambsquarter, and Johnsongrass.

SELECTION OF TRAPPING SITES: See "Trap Density."

HANGING THE TRAP: Assemble the trap as per Trece instruction sheet (pg. EC-3). **Do not** use your fingers to insert the rubber pheromone cap. Pheromone caps should be placed in the plastic friction holder, and the holder stapled to the inner surface of trap top (Fig. 1). Hang the trap from a metal rod about two to three feet above the ground. Traps should be located near host plant areas upwind of the high-hazard facility. Keep away from high dust areas.

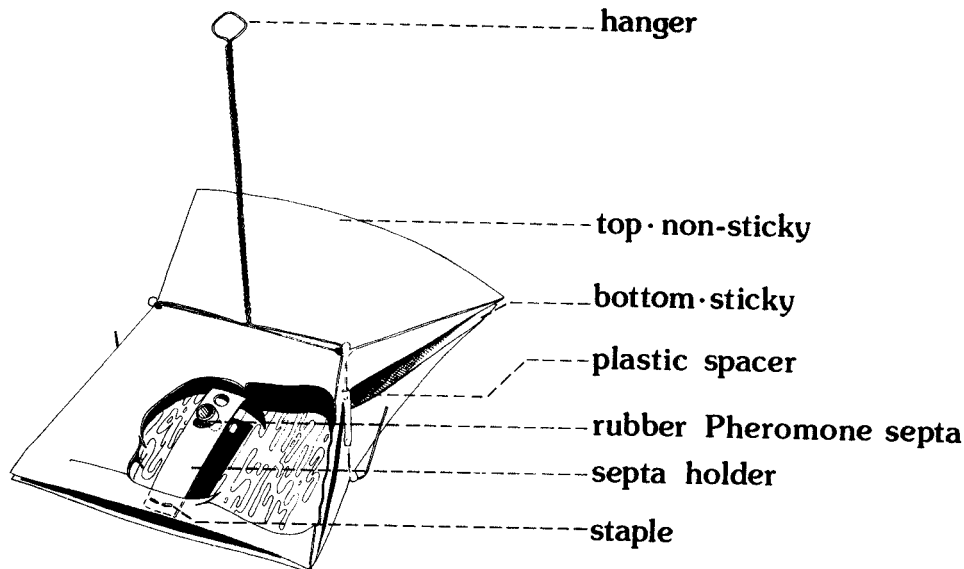


FIGURE 2. PHEROCON 1C™ TRAP DIAGRAM

TRAP INSPECTION AND SERVICING: Change the trap bottom every two weeks or sooner depending on the amount of accumulated debris. The trap top can be changed as needed. Trap identification and dates should be located on the underside of the sticky bottom. When removing old pheromone caps and trap bottoms, return them to the office for proper disposal. Do not dispose of old trapping materials at any location other than the office.

COLLECTION AND SUBMISSION OF SAMPLES: When a suspect specimen is detected, the entire sticky bottom should be removed, carefully folded so as not to damage the specimen, and sent to Sacramento with a Standard Form 65-020, "Pest and Damage Record" (PDR). Be sure specimens are marked "RUSH," both on the identification slip and on the outside of the package. Include the trap number in the "Entomology" section of the PDR Form

BAITING INTERVAL: Change the pheromone cap every two weeks.

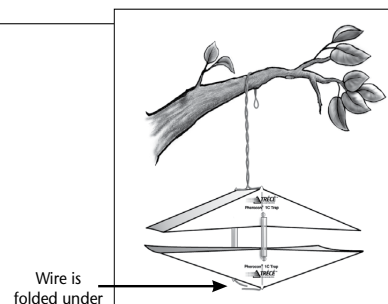
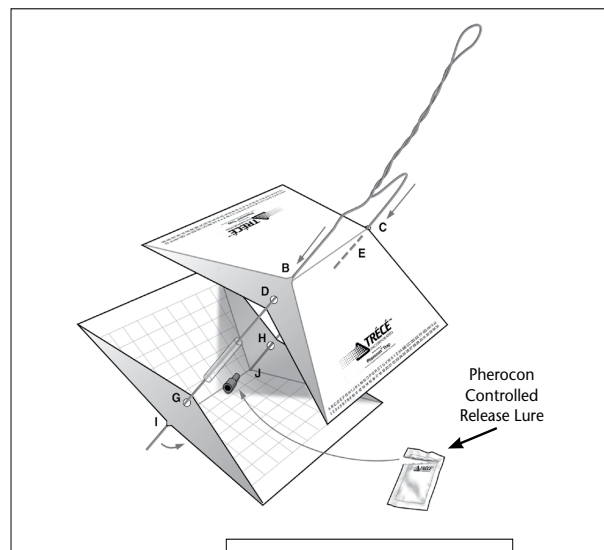
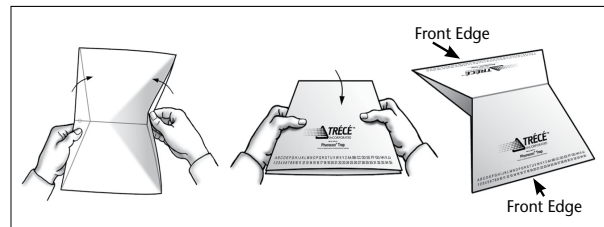
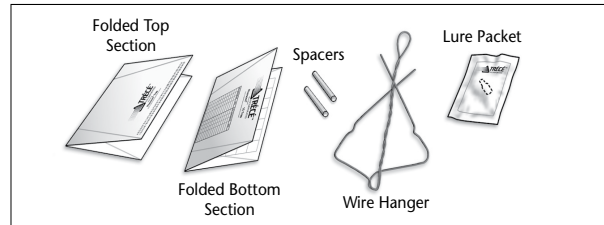
TRAP RELOCATION: No relocation is normally required. However, facilities that change operations or new facilities will require adjustments in trap deployment.

PHEROCON® 1C Assembly Instructions



TRAP ASSEMBLY INSTRUCTIONS

1. Remove one folded top section, one folded bottom section (with grid and glue on inside surface), two spacers, one wire hanger and one lure packet from the kit box.
2. Open top section and fold outer triangle-shaped areas inward (toward the side without printing.) Crease fold along score marks by folding top section until flat. Allow top section to open naturally to form correct shape as shown. Follow these same steps and fold the glue-coated bottom section inward (toward the glue-coated side.) Be sure the front edges are straight, not bowed.
3. Place one Pherocon lure directly in the center of bottom section.
4. Straighten wire hanger and insert ends through Holes B and C in top section. Weave wire ends through Holes D and E from the inside. Push wire hanger all the way through until it is resting on top of the trap.
5. Slide one spacer on each wire end until it is held between the wire and the side panel.
6. Insert ends of wire hanger into Holes G and H in bottom section. Weave wire ends through Holes I and J from inside.
7. Push top and bottom section together so that spacers are also held between the wires and the side panels. Bend ends of the wire inward and under the trap.
8. To hang the trap in a tree, wrap braided portion of the wire securely around tree limb.
9. Place trap in orchard according to location and density recommendations.



Visit our website: www.trece.com or call 1-866-785-1313

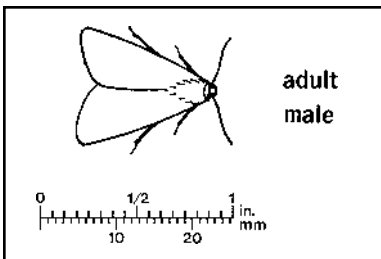
© 2008 TRECE, Adair, OK USA
TRECE, PHEROCON, CIDETRAK are registered trademarks of Tréce, Inc., Adair, OK USA



Your Edge – And Ours – Is Knowledge.



Photo courtesy Marlin E. Rice



European Corn Borer
Ostrinia nubilalis (Hübner)

PROGRAM: European Grapevine Moth (EGVM) Trapping

TYPE OF TRAP: Red delta trap with ends open (Fig. 1). The red color is neutral to honeybees.



FIGURE 1. DELTA TRAP

ATTRACTANT: A synthetic sex pheromone (Fig. 2) dispensed in a 1/2 inch long rubber septum.



FIGURE 2. PHEROMONE-INFUSED RUBBER SEPTUM

TRAPPING SEASON: The trapping protocol is subject to change. Consult with your detection entomologist and the European Grapevine Moth Trapping Guidelines.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

TRAP DENSITY: The trapping protocol is subject to change. Consult with your detection entomologist and the European Grapevine Moth Trapping Guidelines.

Delimitation Survey - When a positive sample is identified, a delimitation is implemented. Trap density in the surrounding 100 square miles is increased to 25 traps per square mile, using the original find as the epicenter (Fig 3). During a delimitation, grapes are the priority host, but secondary hosts should be used when needed to obtain the required trap density. Half-sheet trap cards (Form 60-206) may be used for delimitation projects.

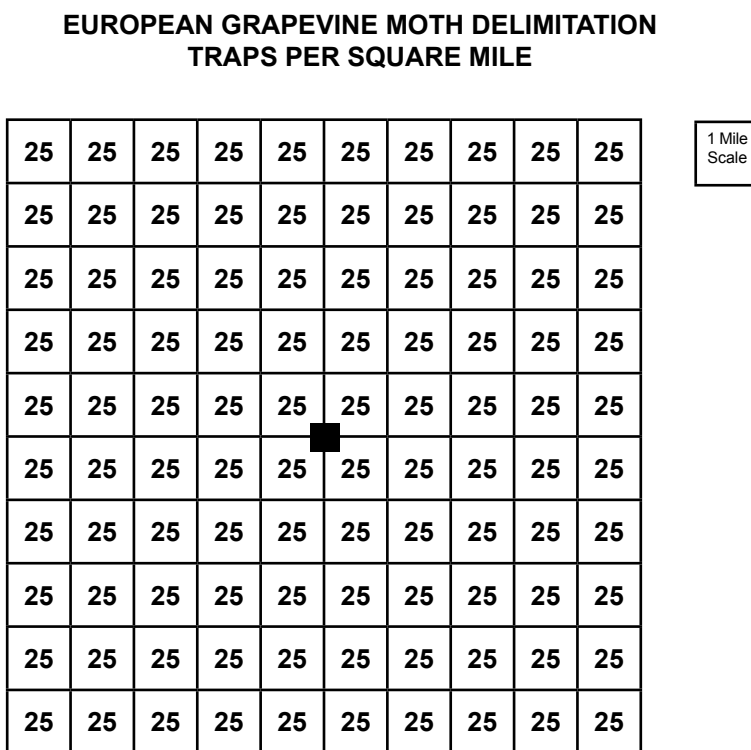


FIGURE 3.

INSPECTION FREQUENCY: The trapping protocol is subject to change. Consult with your detection entomologist and the European Grapevine Moth Trapping Guidelines.

Delimitation Survey - Inspect all traps daily for the first week. After the first week, service all traps weekly unless directed otherwise by project management.

HOSTS: The EGVM is primarily considered to be a pest of grapes. However, there is evidence that complete life cycles may occur in such hosts as olive, blackberry, apricot, nectarine, persimmon, cherry, prune, kiwi, pomegranate, and various ornamental plants including *Daphne gnidium* (the reported original host plant in the Mediterranean area), rosemary, privet, and carnation. These are considered secondary hosts.

SELECTION OF TRAPPING SITES: Selection of a trap site will depend on two main criteria: a suitable host tree, plant, or vine and uniform trap distribution throughout the assigned area. At a density of sixteen traps per square mile, every effort should be made to maintain an even distribution of traps while also utilizing the best hosts within the sphere of influence of the trap. A suitable host can be defined as one of the listed host plants with flowers, fruit, or new growth, and one that is suitable for trap placement as described under "Hanging The Trap."

HANGING THE TRAP: Urban trapping - Hang the trap from the branches of a host or near a host. Leave the ends of the trap open and free from obstructions. Place the trap inside the canopy of the tree, 2/3 up and 2/3 out from the trunk (Fig. 4).

Commercial grapes - In vineyards, hang the trap from the vine support wire. It is also acceptable to hang the trap from metal JB poles or from the branches of the vines. The trap ends should be open and parallel to the vineyard row.

Avoid hanging any trap from small branches or cordons to minimize trap loss due to harvest, maintenance, pruning, or vine growth.

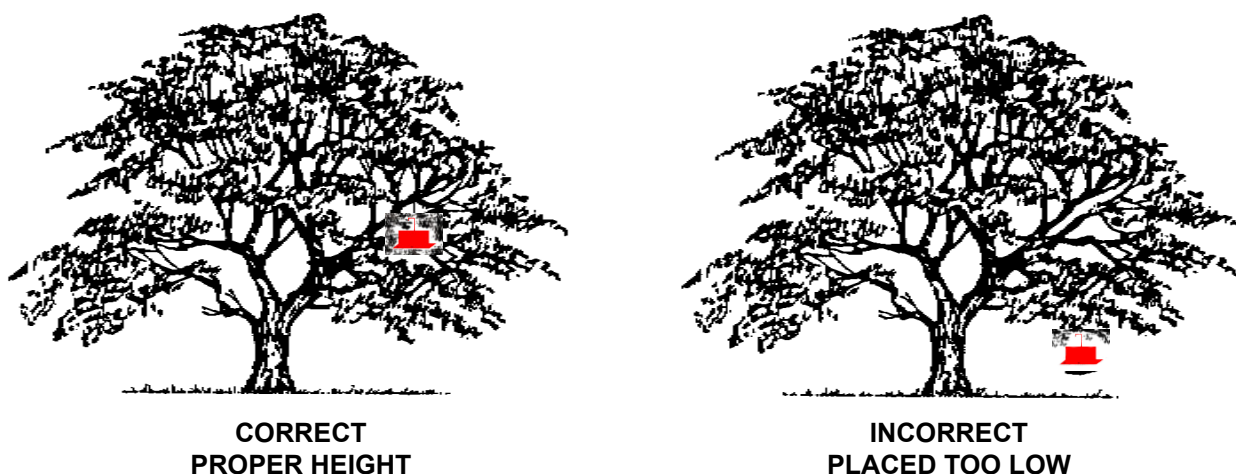


FIGURE 4.

TRAP INSPECTION AND SERVICING: Observe the inside sticky areas by looking through both ends of the trap.

COLLECTION AND SUBMISSION OF SAMPLES: Suspect specimens should be kept in the trap and submitted in a plastic bag. Use Standard Form 65-020, "Pest and Damage Record" (PDR). Be sure specimens are marked "RUSH," both on the identification slip and on the outside of the package. When removing a trap for a moth identification, be sure to hang a replacement trap in its place. Include the trap number in the "Entomology" section of the PDR form.

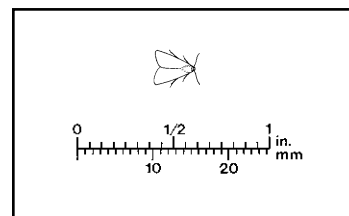
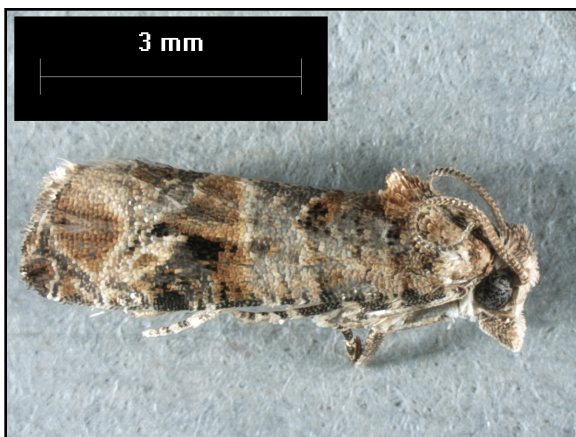
BAITING INTERVAL: Re-bait every four weeks. TO PREVENT CONTAMINATION OF OTHER SURFACES, **DO NOT TOUCH THE PHEROMONE SEPTUM.** Use the opened septum pouch (or designated forceps) to place the septum directly on the sticky glue on the inside bottom of the trap, in the center square of a removable insert, or in a lure basket if needed (especially in windy areas). Remove a used septum from the trap with designated forceps and place it in a ziploc bag to be disposed of at the office. **NEVER DISPOSE OF USED LURES IN THE FIELD.**

TRAP RELOCATION: Urban piggybacked sites - Traps will relocate with the piggybacked detection traps.

Commercial grapes - Traps do not need to be relocated. Prior to vineyard treatments and/or harvest, traps may be moved to the perimeter of the vineyard to comply with re-entry regulations.



Photos by Marc Epstein, California Department of Food and Agriculture



**EUROPEAN GRAPE-
VINE MOTH**
Lobesia botrana (Denis &
Schiffermüller)

PROGRAM: European Pine Shoot Moth (EP) Trapping

TYPE OF TRAP: Pherocon® IIC

The Pherocon® IIC trap (Fig. 1) is a tent-like cardboard trap with all inside surfaces coated with stickum. A rubber cap impregnated with EP pheromone attracts male moths onto the sticky capture surface.



FIGURE 1. PHEROCON® IIC TRAP

ATTRACTANT: A synthetic sex pheromone.

TRAPPING SEASON: Traps should be placed after May 1 and be removed prior to July 31. (For higher elevations, and the cooler northern coastal areas, flight most likely will not occur until late June or early July). There is one generation a year.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

TRAP DENSITY: In California, only sites of some introductory risk are being trapped at this time. These sites are generally nurseries where living trees may be introduced from infested areas of the United States. Use one trap per site, or one trap per four acres.

INSPECTION FREQUENCY: Inspect traps once every two weeks for detection. Inspect at least weekly for delimitation or intensive survey.

HOSTS: Many species of pine are attacked, including Scotch pine, Austrian pine, mugho pine, red pine, lodgepole pine, and ponderosa pine. For detection purposes, any pine in an area at risk for EP should be considered a potential host.

SELECTION OF TRAPPING SITES: See "Trap Density."

HANGING THE TRAP: Traps are most effective if placed in host trees. Traps should be placed five to seven feet above the ground on the outer periphery of the pine foliage. Do not hide traps beneath the branches. If host plants are small and fragile, place the trap on a stake or some other support, but always touching or directly adjacent to host plant foliage. **DO NOT** use your fingers to insert rubber pheromone caps. Pheromone caps should be placed in the plastic friction holder and the holder stapled to the inner surface of the trap top.

TRAP INSPECTION AND SERVICING: Remove the trap from the host tree. Open both ends of the trap to observe trapped specimens. If there are no suspect specimens, close the ends and return the trap to the host tree. If the trap body deteriorates, replace it and use the old pheromone cap if it is less than 6 weeks old. Do not handle the pheromone cap with your fingers; use forceps. Do not dispose of old trap materials in the field. Return them to the office for disposal.

COLLECTION AND SUBMISSION OF SAMPLES: Suspect specimens should be kept in the trap and sent in a plastic bag to Sacramento. Use Standard Form 65-020, "Pest and Damage Record" (PDR). Be sure specimens are marked "RUSH," both on the identification slip and on the outside of the package. Include the trap number in the "Entomology" section of the PDR Form.

BAITING INTERVAL: The pheromone cap is good for six weeks.

TRAP RELOCATION: No relocation is necessary.

Pherocon® IIB & IIC

Assembly Instructions

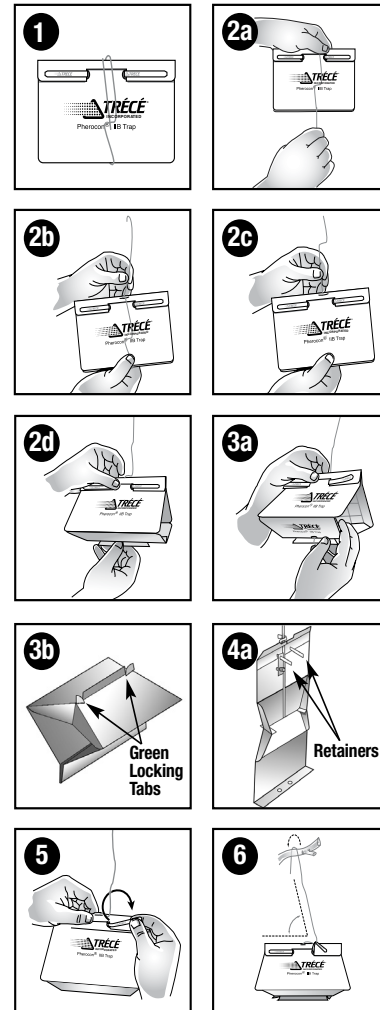


TRAP ASSEMBLY INSTRUCTIONS

1. Folded trap with rigid wire hanger.
2. See sketch 2a, 2b, 2c and 2d to unfold rigid wire hanger. Gently pull trap open to crook in wire.
3.
 - a. Grasp the bottom of the trap with thumb and third finger, and push the end flaps up gently with the first and second fingers. Be sure to gently push up and in for best results.
 - b. Once in position, the green locking tabs at the bottom of the trap will need to be turned slightly to lock. Once locked the trap will be easier to handle.
4.
 - a. To open the trap, unfold (straighten) top two retainers and pull top of trap open and downward.

"Trap opens easily, while hanging, to count insects."

- b. Insert Pherocon Long-Life L²™ or MEGALURE™ into the bottom hole of the lure holder. Place lure holder on either retainer. Then close trap and fold retainers back.
5. Once the lure is positioned with holder (as seen in diagram 4b), then close trap and wrap one end of retainer around hanger wire at the crook. This will anchor wire and prevent it from slipping.
6. Make sure trap is level by slightly bending angle of the hanger when attached to tree branch.



NOTE: PATENT PENDING

Please see Trécé's IPM Partner® Guidelines for further instructions.

OUR EDGE & YOURS, IS KNOWLEDGE

TRÉCÉ, INC. P.O. BOX 129 ADAIR, OK 74330 918-785-3061 FAX: 918-785-3063

TRÉCÉ®, Pherocon®, STORGARD® and CIDETRAX are registered Trademarks of TRÉCÉ Inc., Adair, OK USA
© 2005 TRÉCÉ, Adair, OK USA

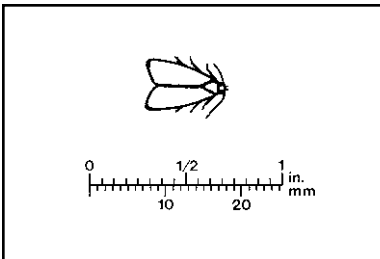


INSECT MONITORING SYSTEMS & PHEROMONES

www.trecede.com



Photo courtesy of Gary Daterman, USDA - Forest Service



European Pine Shoot Moth
Rhyacionia buoliana (Schiffermüller)

PROGRAM: Gypsy Moth Trapping

TYPE OF TRAP: Gypsy Moth Delta Trap

The gypsy moth delta trap (Fig. 1) has three sides. Two interior surfaces are coated with stickum, and the third has the pheromone strip or string attached to it. Male moths enter through the triangular opening at either end of the trap and are captured on the sticky surfaces.



FIGURE 1. GYPSY MOTH DELTA TRAP

ATTRACTANT: (+) enantiomer of disparlure - a synthetic sex pheromone contained in a laminated plastic strip or a string.

TRAPPING SEASON: Traps may be placed prior to June 1, with the first servicing planned by July, and removed at the last regular servicing after September 1. (At higher elevations or in cooler climates, trap placement may be delayed, depending on accessibility. In these instances, trap removal should be delayed until the traps have been deployed for the necessary three month period).

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

TRAP DENSITY: Detection Survey - Use two traps per square mile in urban areas and rural residential areas of 300 or more homes per square mile.

High-hazard sites (for all counties) - Use a minimum of one trap per site. High-hazard sites include campgrounds, recreational areas, mobile home and RV parks, state parks, federal parks and monuments, properties of recent immigrants from gypsy moth infested areas, moving companies, etc.

Asian gypsy moth trapping - Seaport locations identified as high risk for Asian gypsy moth should be trapped at 25 traps per square mile over four square miles, using the port site as the epicenter.

For remote areas or Asian gypsy moth trapping, where only gypsy moth traps are in use, half-sheet trap cards (Form 60-206) may be used (see page xxvi).

Delimitation Survey - When a gypsy moth is trapped, trap densities will be increased within 48 hours to 25 traps per square mile over four square miles surrounding the find, using the original find as the epicenter (Fig. 2). Half-sheet trap cards (Form 60-206) may be used for this purpose.

GYPSY MOTH DELIMITATION SURVEY

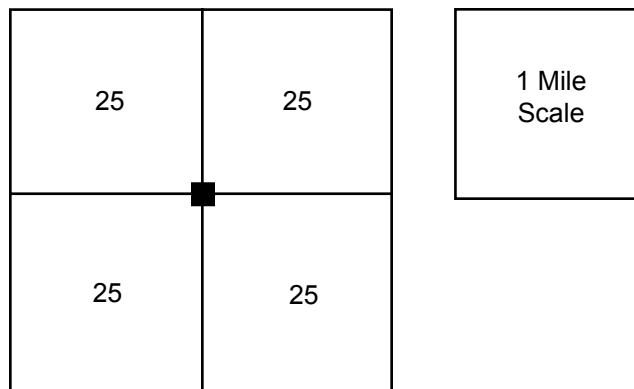


FIGURE 2.

If the moth is captured in a trap near or at the site of a quarantine inspection find (resulting from the movement of household goods from an infested state), and no other moths have been trapped nearby, a single square mile around the catch will be trapped using 25 traps.

Additional moth finds may necessitate additional trap deployment.

The delimitation trapping array for Asian gypsy moth is more intensive than the delimitation for European gypsy moth. The core square mile will contain 49 traps and the surrounding four buffers will have 25 traps per square mile. An additional 1/2 mile around the outside of the 4th buffer will be trapped at 12 traps per 1/2 mile. Figure 3 outlines the trapping array for an Asian gypsy moth delimitation.

ASIAN GYPSY MOTH DELIMITATION SURVEY

ASIAN GYPSY MOTH TRAP TOTALS

6	12	12	12	12	12	12	12	12	12	6
12	25	25	25	25	25	25	25	25	25	12
12	25	25	25	25	25	25	25	25	25	12
12	25	25	25	25	25	25	25	25	25	12
12	25	25	25	25	25	25	25	25	25	12
12	25	25	25	25	49	25	25	25	25	12
12	25	25	25	25	25	25	25	25	25	12
12	25	25	25	25	25	25	25	25	25	12
12	25	25	25	25	25	25	25	25	25	12
12	25	25	25	25	25	25	25	25	25	12
6	12	12	12	12	12	12	12	12	12	6

1 Mile Scale

Core Area:	1 sq. mile	=	49 traps
1 mile buffer:	8 sq. miles	=	200 traps
2 mile buffer:	16 sq. miles	=	400 traps
3 mile buffer:	24 sq. miles	=	600 traps
4 mile buffer:	32 sq. miles	=	800 traps
Additional 1/2 mile buffer		=	456 traps
Total traps:	100 sq. miles	=	2,505 traps

FIGURE 3.

INSPECTION FREQUENCY: Inspect traps one time at midseason for gypsy moth detection and every two weeks for Asian gypsy moth. For delimitation or intensive survey, inspect daily until determined otherwise.

HOSTS: Larvae feed on trees and shrubs. For trapping adult male moths, a specific host tree is not necessary.

SELECTION OF TRAPPING SITES: Maintain a uniform distribution. The placement of traps on urban properties and high-hazard sites is a priority. Gypsy moths are most likely introduced on household effects. Due to the dispersal of the pheromone through the wind and air currents, traps should not be placed in close proximity to fences, brick walls, houses or other breeze-sheltered areas. Male moths usually follow the edges of woodlands. They do not frequent large, open areas without trees or shrubs. Avoid areas where children play frequently, areas soaked by sprinklers, and areas used by barnyard animals. If public areas are utilized, select areas where vandalism is minimized.

HANGING THE TRAP: One method is to affix the trap four to five feet off the ground with a loop of wire around a single-trunk tree with a diameter of 12 to 24 inches (Fig. 4). Another alternative is to use a staple to secure the trap to the tree trunk. To staple, open the trap and staple to the tree from the inside top of the trap. This allows the trap to remain stapled to the tree when the trap is opened for inspection by removing the two paper clips. Smaller or larger diameter trees can be used when the preferred size is unavailable. Choose a tree where the trap will take advantage of air currents to disperse the lure.

Do not place the gypsy moth trap on a multi-trunk tree. Gypsy moth males will orient to the pheromone to get to the area of the pheromone source, and then orient visually to something vertical (i.e., a trunk). If there are multiple trunks, it could land on one without the trap and walk around, never finding the trap. Also, never hang the gypsy moth trap from a branch. Use the sunny (usually south) side of the tree. Snails and earwigs may crawl up the trunk and congregate on the inside of the traps. If this is a problem, move the trap. If a possibility of vandalism exists, the traps can be moved higher up the trunk or to the back side, out of view.

Do not block trap entrances with foliage and other obstacles. Be sure the trap opening conforms neatly along the perforation so that a standard triangular opening is maintained. Do not wrap wire tightly as tree girdling can occur over the trapping season.

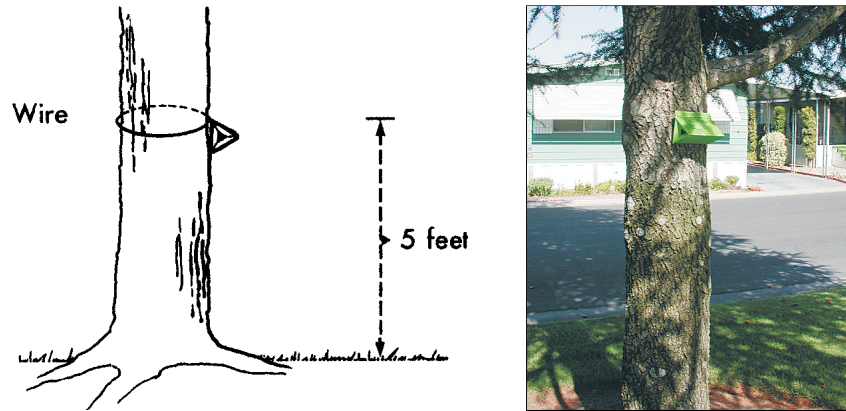


FIGURE 4. STANDARD METHOD FOR HANGING A GM TRAP

TRAP INSPECTION AND SERVICING: Observe the inside sticky areas by opening the trap and reclosing when finished, or look through both ends of the trap. Moths are commonly caught under the lower lip of the trap entrance and can be overlooked. The pheromone and trap body will last all season. Traps that were not used should be discarded at season's end. Additionally, it is important to ensure that all traps are removed from the field at the end of the trapping season. If left in the field, they may attract moths. Since abandoned traps will not be inspected, trapped moths will go undetected. Research indicates that the lure will continue to attract some moths even after nine months of exposure.

COLLECTION AND SUBMISSION OF SAMPLES: Suspect specimens should be kept in the trap and submitted in a plastic bag. Use Standard Form 65-020, "Pest and Damage Record" (PDR). Be sure specimens are marked "RUSH," both on the identification slip and on the outside of the package. When removing a trap for a moth identification, be sure to hang a replacement trap in its place. Include the trap number in the "Entomology" section of the PDR Form.

Note: In the event that a moth is trapped that is alive, place the trap with the specimen in a sealed plastic bag and do the following before shipping the specimen for identification: 1) remove the trap from the plastic bag and freeze the specimen for 30 minutes, 2) let the specimen thaw at room temperature for an additional 30 minutes, and 3) make sure that the trap will not collapse on the specimen before placing the trap in a plastic bag for shipment. **DO NOT USE ALCOHOL OR OTHER KILLING AGENTS** as these substances may hinder the analysis and identification of the specimen.

BAITING INTERVAL: The trap and pheromone are good for the entire season unless they physically deteriorate due to water, dust, etc. TO PREVENT CONTAMINATION OF OTHER SURFACES, **DO NOT TOUCH THE PHEROMONE STRIP.**

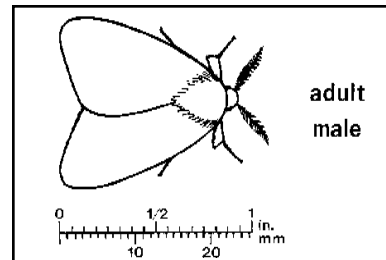
TRAP RELOCATION: Once the trap is suitably placed and a uniform grid pattern is established, trap relocation is not necessary. Vandalism or missing traps would suggest placing the trap in a different location.



USDA APHIS PPQ Archives. Image 26520796. ForestryImages.org. <http://www.forestryimages.org/>. December 24, 2001.



Photo by Ray Bingham, California Department of Food and Agriculture



GYPSY MOTH
Lymantria dispar (Linnaeus)

PROGRAM: Japanese Beetle Trapping

TYPE OF TRAP: Japanese Beetle

This plastic trap (Fig. 1) consists of four fins attached to a funnel which directs beetles into a screw-on can at the bottom of the trap. An "S" hook suspends the entire trap from a metal rod. The new style rods do not require "S" hooks (see color photo below). Beetles respond to the attractants, fly into the fins, and fall down the funnel into the beetle can.

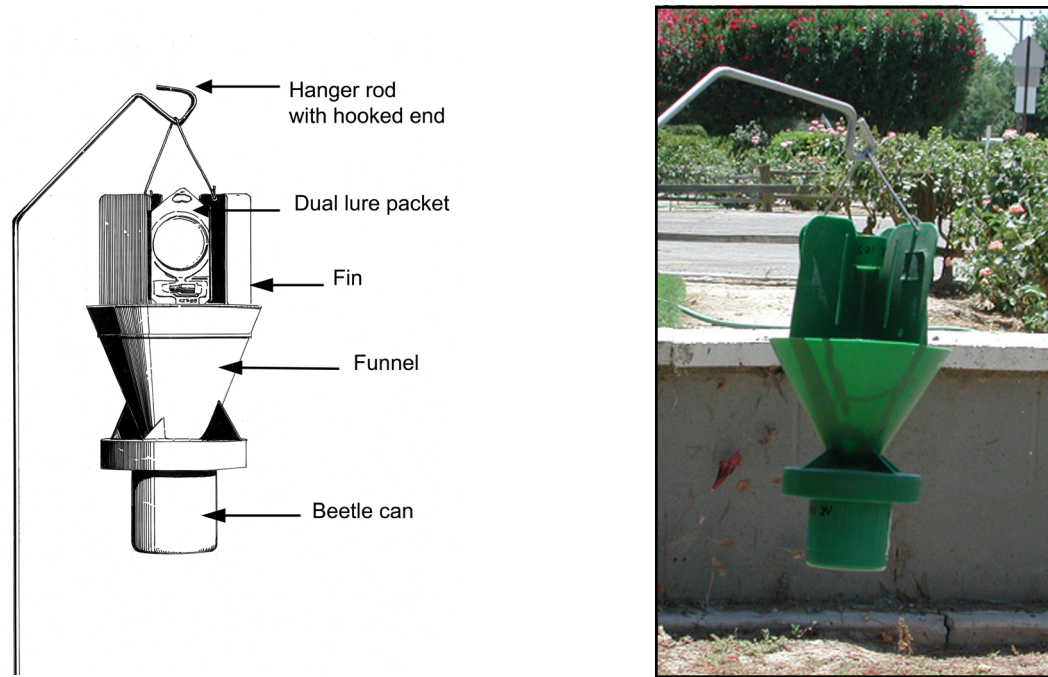


FIGURE 1. JAPANESE BEETLE TRAP

ATTRACTANTS: There are three components to the attractancy of the Japanese beetle trap. See table below.

Trap Component	Stimulus	Response
Lure Wafer	Phenethyl propionate, Eugenol & Geraniol	Feeding
Pheromone Tab	Japonilure	Sexual response by male
Trap	Green color	Visual

TRAPPING SEASON: Traps may be deployed prior to June 1, with the first servicing planned by July, and removed at the last regular servicing after September 1.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

TRAP DENSITY: Detection Survey - Use two traps per square mile in both urban areas and rural residential areas of 300 or more homes per square mile.

Delimitation Survey - When a Japanese beetle is trapped, densities will increase in the 49 square miles surrounding the find (Fig. 2). A total of 450 traps will be required. Trap deployment should be completed within 48 hours. Half-sheet trap cards (Form 60-206) may be used for this purpose.

JAPANESE BEETLE DELIMITATION TRAPS PER SQUARE MILE

JAPANESE BEETLE TRAP TOTALS

5	5	5	5	5	5	5
5	5	5	5	5	5	5
5	5	25	25	25	5	5
5	5	25	50	25	5	5
5	5	25	25	25	5	5
5	5	5	5	5	5	5
5	5	5	5	5	5	5

1 Mile Scale

Core Area:	1 sq. mile = 50 traps
1 mile buffer:	8 sq. miles = 200 traps
2 mile buffer:	16 sq. miles = 80 traps
3 mile buffer:	24 sq. miles = 120 traps
Total:	49 sq. miles = 450 traps

FIGURE 2.

INSPECTION FREQUENCY: Inspect traps one time at midseason. For delimitation or intensive survey, inspect daily until determined otherwise.

- HOSTS:**
- Turf - larval host
 - Roses - especially yellow and light colored varieties
 - Grapes
 - Most deciduous fruit trees - especially apple; also cherry, peach, apricot, pomegranate, pistachio, almond, etc.
 - Shade trees - California black oak, valley oak, olive, strawberry tree, weeping willow, etc.
 - Most shrubs - including cotoneaster, ceanothus, pineapple guava, heavenly bamboo
 - Corn, soybean, and asparagus
 - Many weeds

SELECTION OF TRAPPING SITES: A location where turf as well as other hosts are available is preferable when choosing a trap site. Priority should be given to selecting a property with turf and roses.

NOTE: HIGH-HAZARD TRAPPING: Beetles have hitchhiked aboard planes originating in the eastern United States. Therefore, airports having a large volume of flights arriving from the east coast are considered to be a high risk for Japanese beetle introduction.

Trap density around airports that receive significant air travel from Japanese beetle infested areas shall be 25 traps per square mile placed in a 1-mile buffer. Trap density around freight forwarding facilities, such as FedEx and UPS, shall be 25 traps in the square mile surrounding the facility. Consult with your district entomologist when identifying appropriate airports and other facilities. He or she can give further direction regarding trap density and placement.

HANGING THE TRAP: All Japanese beetle traps must be placed so that they receive full sunlight from 10:00 a.m. to 3:00 p.m. They must also be placed out in the open, avoiding obstacles such as houses and fences (including chain link) that interfere with lure dispersal and trap efficiency. Traps are to be placed 10 - 25 feet away from hosts (excluding turf). Placing the trap closer than 10 feet or in contact with host foliage may result in beetles landing on the host plant rather than falling down into the beetle can. Do not place the trap under foliage where debris may fall into the trap and block the funnel opening. Traps should not be placed in such a manner that will impede the safe operation of lawn care equipment. (The edge of the lawn or just off the turf is best).

Trap placement and trap height will depend upon the hosts that are available at the selected site. When only turf or turf and a high growing host (tree) is available, the trap height will be 11 to 22 inches from the funnel rim to the ground (Fig. 3). When turf and a low growing host (roses, grapes, etc.) are available, then the trap height will be at host level (Fig. 4).

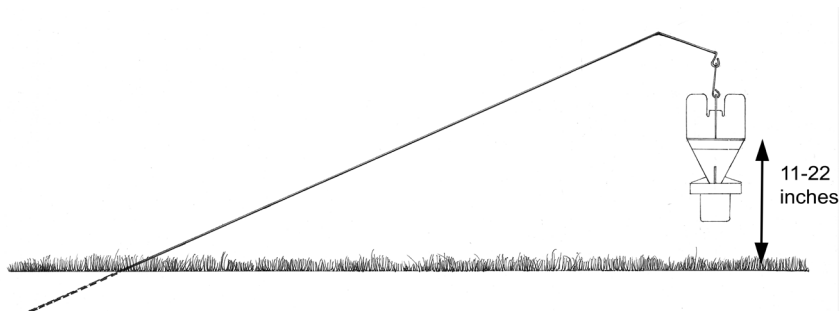


FIGURE 3. TRAP HEIGHT FOR TURF OR TURF WITH A HIGH HOST

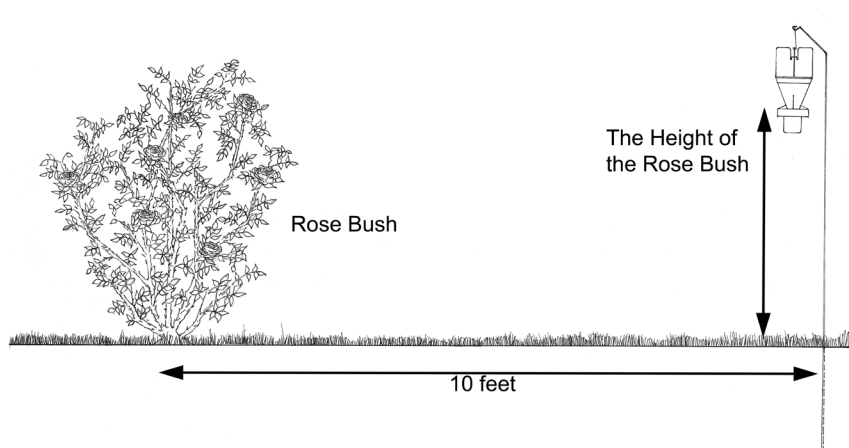


FIGURE 4. TRAP HEIGHT FOR A LOW HOST.



POOR PLACEMENT
(In roses)



GOOD PLACEMENT

To deploy the trap:

1. Push the hanger rod into the ground so that it is stable and will support the trap at the desired height from the ground.
2. Suspend the trap from the arm of the hanger rod so that it swings freely.
3. Secure the dual lure firmly in the hole provided on one fin of the trap.
4. Place and date the lure in the trap as depicted in Figure 1.
5. Place clear tape (six inches long) on trap funnel or beetle can for recording trap number and service data.

TRAP INSPECTION AND SERVICING: Inspect the trap by removing the beetle can, and examine the contents while specimens are still in the can. Exercise caution while servicing the trap; the beetle(s) may be alive and could escape, or dried specimens could be lost in the wind. Remove any debris that has accumulated in the funnel of the trap, **including** cobwebs. Mark the date tape at each servicing.

COLLECTION AND SUBMISSION OF SAMPLES: Collection methods for suspect Japanese beetles will vary as to whether the beetles are found dead or alive.

Live beetles will be placed in alcohol vials only. (See instructions for shipping on page xiv).

Dead beetles will be placed in dry vials only. Trapped dead beetles can be tested by the lab for traces of alcohol. The presence of alcohol would indicate a possible “planted” specimen.

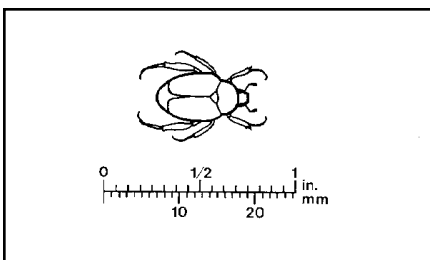
Send specimens to Sacramento with a Standard Form 65-020, “Pest and Damage Record” (PDR). Be sure the specimens are marked “RUSH,” both on the identification slip, and on the outside of the package. Include the trap number in the “Entomology” section of the PDR Form.

BAITING INTERVAL: The dual lure is to be replaced during midseason. The lure should be dated when placed or exchanged. NOTE: the design of the lure dispensers may change from year to year.

TRAP RELOCATION: No trap relocation is needed.



Walker, Bradford E., Vermont Department of Forests, Parks and Recreation.
Image 4836022. ForestryImages.org <http://www.forestryimages.org/>. December 24, 2001.



JAPANESE BEETLE
Popillia japonica Newman

PROGRAM: Khapra Beetle Trapping

TYPE OF TRAP: Khapra Beetle Trap

Khapra beetle (KB) traps are pre-assembled (Fig. 1). A KB trap kit contains 6 wall-mount traps plus one Pherocon II aerial sticky trap, food bait, and 7 pheromone lures. The new KB trap was designed to be vertically wall-mounted as opposed to the older floor type. The new trap can be used at any height, as well as floor level, as long as it is attached to a vertical surface. The Pherocon II trap is for diversion of warehouse beetles (WB), *Trogoderma variable*, which are also attracted to the pheromone (see Warehouse Beetle Trapping at end of instructions).

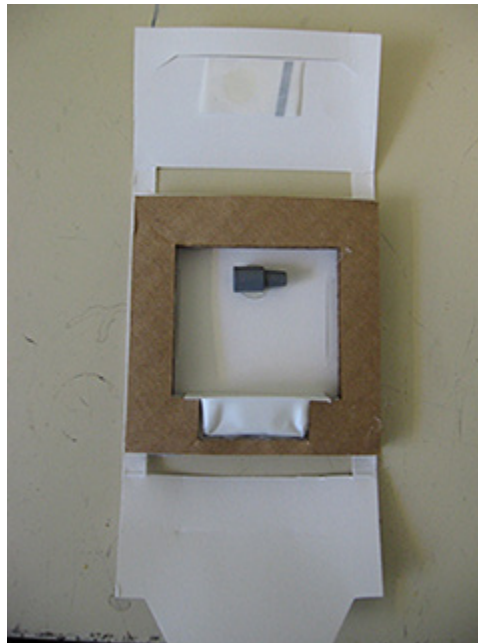


Figure 1. KB trap opened.

ATTRACTANTS: KB traps use both a food bait, in the form of ground wheat germ, and a sex attractant, in the form of a pheromone lure in a rubber septum. The food bait is supplied in a packet. Alternately, wheat germ can be prepared from ordinary wheat germ, purchased in a health food or natural foods store. The use of an ordinary blender, a food processor, or a mortar and pestle, will reduce the wheat germ to a sufficiently fine material. A 4 oz bottle of fine wheat germ is enough for about 50 or more traps for several months. A plastic spoon carried along will be useful in dispensing the wheat germ into the food tray.

TRAPPING SEASON: The KB is a tropical insect. Under ambient conditions a population will not produce adults after the onset of cooling temperatures (<68°F). Larvae become quiescent (a weak form of diapause) under cool conditions. Do not trap until the warm season starts and average temperatures are above 70°F in the trapping environment. Insects seldom move below 50°F, and for KB, this is even more critical.

Southern California and Artificially Heated Environments – Year-round.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

All Other Areas – May through October.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

TRAP DENSITY: Space traps 25 to 40 ft apart.

INSPECTION FREQUENCY: Traps should be checked every 4 weeks, at the same time the pheromone lure is replaced. More frequent servicings at 1-2 weeks may be advisable in some instances in order to yield specimens in better condition, which aids identification.

HOSTS: All grain and grain products. Preferred unprocessed stored materials include wheat, oats, rye, barley, corn, rice, flaxseed, pinto beans, black-eyed peas, sorghum, alfalfa seed, cotton seed, and castor beans. Preferred processed materials include corn meal, flour, bread, cottonseed meal, cottonseed cake, oats, breakfast cereals, crackers, spices, malt, noodles, dog food, powdered milk, raisins, and nutmeats. Burlap bagging on either food or non-food products, paper boxes and packing materials used with steel products, art objects, and other items imported from KB infested areas can also act as carriers.

SELECTION OF TRAPPING SITES: Emphasis should be placed on trapping high-hazard facilities receiving bulk products from foreign countries, especially Asia, the Middle East, and Africa. Examples of high-hazard facilities are large food mills, wholesale bakeries, wholesale spice centers, seed companies, burlap bag cleaning establishments, carpet mills, import stores, etc. Facilities which export grains from California may also be trapped in order to fulfill phytosanitary trade requirements.

BAITING: To add the food lure, open the food packet and fill the tray in the bottom of the trap ONLY 1/4 - 1/3 full; a small plastic spoon can be used for this. Do not overfill trays, as this would negate the escape-proof feature and allow insects to crawl out and escape. To add the pheromone lure, peel off the removable strip covering the sticky spots on the inside of the trap. Remove a pheromone septum from its packet with the designated forceps and press on sideways to the sticky spot. Remember not to touch the septum with anything but the forceps in order to prevent contamination of other surfaces. Fold the top flap over and insert the lower flap into the slot. If the flap doesn't close tightly, remove the strip covering a sticky spot inside the top flap and press the flap shut.

PLACING THE TRAP: Remove the two backing strips on the trap to expose the sticky mounting dots, and attach flush to a clean vertical surface. Traps should be placed mainly around the inside of exterior walls and along interior walls. The traps should be mounted high enough to be easily serviced, at about 2 feet. Keep traps at least above broom height to avoid trap loss during cleaning operations. Do not trap in very damp or oily areas, or in areas easily affected by activities such as sweeping or foot traffic, because KB is not likely to occur under these conditions. Preferentially trap cement block walls, other types of porous construction, and cracks in the walls. Other desirable situations are ledges, behind electrical conduits near host material, in tunnels under mills or storage tanks, and near where used sacks are kept. Traps should be dated and numbered. Maps of trap locations should be made to help in locating the traps for servicing.

TRAP INSPECTION AND SERVICING: Traps should be inspected and disposed of at the same building in which they were deployed. Inspection of the trap should be made in a well lighted area protected from the wind. Be aware that all life stages may be present. KB lured to the trap nearly always find their way into the tray over time. However, when checking a trap, also look for insects on other parts of the trap that may be ready to drop into the tray. A sharp tap will usually cause them to fall in. When checking the trap for the last time, firmly tap it over a tray to dislodge any insects that may be present before disposing of it. Avoid carrying traps in a pocket or any container which may result in moving live specimens to other locations.

COLLECTION AND SUBMISSION OF SAMPLES: Place suspect specimens into an alcohol vial. It is not necessary to use a separate alcohol vial for each trap, but a separate vial and PDR slip (Pest and Damage Record, Standard Form 65-020) should be used for each building. Trap collections should be kept in separate alcohol vials from insects found through visual inspection. Specimens which are definitely observed by the collector to be alive and moving should be placed in a separate vial from skins and whole specimens which are not obviously alive. The vial with specimens found alive should be marked with an "A"; the one with those collected dead should be marked "D." These indications should also be placed on the identification slip. Mark "RUSH," both on the identification slip, and on the outside of the package. (See instructions for shipping on page xiv). Include the trap number in the "Entomology" section of the PDR Form.

BAITING INTERVAL: The pheromone lure should be replaced every 4 weeks. To replace the pheromone lure, remove the old septum from the trap using the designated forceps and place in a ziplock bag to be disposed of at the office. Remove a pheromone septum from its packet with the designated forceps and press on sideways to the sticky spot inside the trap. Remember not to touch the septum with anything but the forceps in order to prevent contamination of other surfaces. Fold the top flap over so that the second sticky spot comes in contact with the septum. Do not replace the food lure. If the food lure needs replacing, replace the trap with a new one and dispose of the old one at the same building in which it was deployed.

TRAP RELOCATION: No relocation is required.

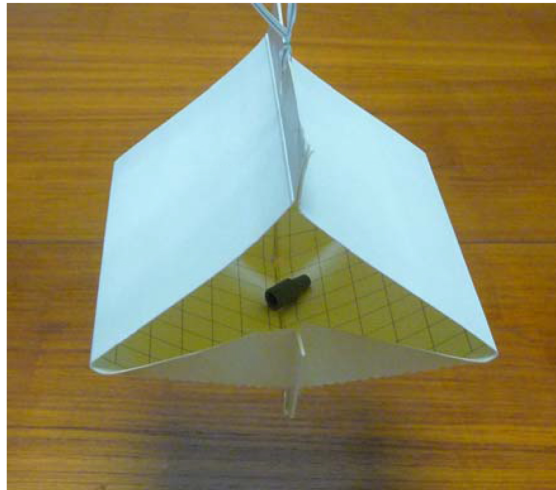
TRAP STORAGE: The traps should be stored in a sealed container (preferably an air-tight plastic container) to avoid possible infestation. Use only clean traps in KB surveys.

VISUAL INSPECTION: Inspections should be performed at the time of year when insects are active. In bulk storage, KB larvae tend to congregate on the surface of the grain and on or near the walls. Inspection of bulk grain is facilitated by the use of a two-pan set of grain dockage sieves. A small portion of grain is scooped into the set of pans, and shaken slightly so that the chaff and small insects fall through the sieve into the solid bottom pan. In empty bins and warehouses, likely places to find larvae are on ledges, in cracks in the floor or walls, under loose plaster and paint, elevator tunnels, tunnels under tanks or mills, old cartons, rags, burlap sacks, newspapers, scrap lumber, and other debris. When inspecting sacked materials, special attention must be paid to the seams and ears of the sack. Rodent bait stations with grain or cereal and other such traps may also be inspected, but care should be taken not to trip the trap. A flashlight, forceps, model paint brush, and an ice pick with a flattened point are necessary tools for efficient inspection. As field determination is impossible, all *Trogoderma* spp. must be submitted to a taxonomist for identification. Any unusual insects or insects present in unusually large numbers should be submitted. Be sure to note "alive" or "dead" on the PDR Form.

WAREHOUSE BEETLE TRAPPING: The pheromone lure is cross attractive to other *Trogoderma* species, especially the warehouse beetle (WB), *Trogoderma variable*. Adults of WB can fly, whereas those of KB cannot, so WB adults can more readily travel to traps than KB adults and may therefore overwhelm the traps. The use of aerial sticky traps in situations where WB is abundant can help resolve this problem by diverting WB into the aerial traps. Any sticky aerial trap such as the Pherocon II or any diamond-, delta-, or wing-shaped trap can be used to divert WB. Place a pheromone lure on the stickum in the trap and hang the trap in the open headspace of the building. Use one aerial trap per 2,500–5,000 sq ft or one for every 6 KB traps. Dispose of traps when they are full; they do not need to be inspected because KB cannot fly up to them. To further reduce the number of WB captured in KB traps indoors, sticky aerial traps may be installed outdoors near the building.

Khapra Beetle Kit

Consists of 1 Decoy trap (Diamond trap with grid interior and gray septa pheromone lure) and 6 Khapra Beetle wall traps with food bait and gray septa pheromone



Khapra Beetle Decoy Trap

Assembly of Khapra Beetle Wall Trap

Khapra Beetle Wall Trap consists of three components:



Cardboard insert with food tray



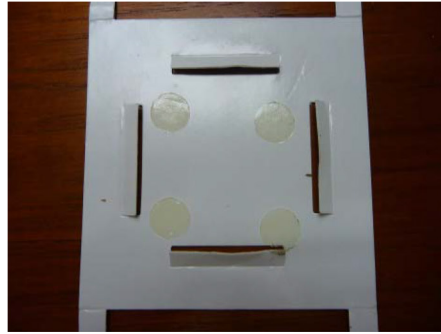
Gray septa pheromone lure



Outside cover with adhesive pads



The first step is to fill the food tray.



Then remove the cover on the adhesive pads



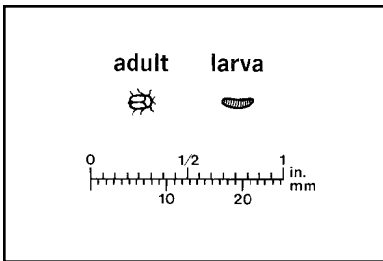
Next use pressure to adhere cover to wall



Then remove the cover pad on the adhesive pad and paste the septa. Place carton with food inside cover



Then close trap top first. If the trap is in high traffic area or subject to disturbance adhesive pad on inside of cover may be exposed to provide extra strength to hold cover sections together



KHAPRA BEETLE
Trogoderma granarium Everts

PROGRAM: Mediterranean Fruit Fly (Medfly) Delimitation Trapping

TYPE OF TRAP: ChamP™ Trap

The ChamP™ trap (Fig.1) is a hollow, yellow panel trap with two perforated sticky sides. When folded, the trap is rectangular in shape (7" long, 6" wide), resembling a large tea bag. A solid trimedlure plug is placed inside the trap.

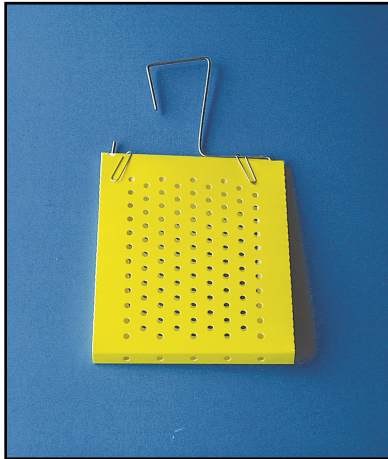


FIGURE 1. CHAMP™ TRAP

ATTRACTANT: Trimedlure (TML) and yellow color

Trimedlure acts primarily as a male attractant. When there is a high population or an absence of males, females may be drawn to the trap. There is no insecticide in the lure.

TRAPPING SEASON: Determined by project management.

TRAP DENSITY:

Delimitation Survey - When a Medfly is collected in an area, trimedlure baited traps are placed in a 100-50-25-20-10 per-square-mile trap array sequence over 81 square miles. Traps in the core mile and the surrounding eight miles will be ChamP™ traps baited with trimedlure. Additionally, 25 Multilure Traps (MT) baited with the Heath three component lure (ammonium acetate, putrescine, and trimethylamine) will be placed in the core mile (Fig. 2). The MT traps are in addition to the detection McPhail traps baited with either torula yeast or Nu-Lure (Table 1, MP-3) already in place. Trap densities within the core square mile are increased within 24 hours. All traps within the 81 square mile area should be in place within 72 hours (see action plan for medfly revised December 1999).

In the situation that an incomplete or unidentifiable fruit fly specimen is found, an alternative 1 mile delimitation is completed using the traps and numbers listed below for a "Core Area."

**MEDFLY DELIMITATION
TRAPS PER SQUARE MILE**

**CHAMP™, JACKSON, & MULTILURE
TRAP TOTALS**

10	10	10	10	10	10	10	10	10
10	20	20	20	20	20	20	20	10
10	20	25	25	25	25	25	20	10
10	20	25	50	50	50	25	20	10
10	20	25	50	$\frac{25}{100}$	50	25	20	10
10	20	25	50	50	50	25	20	10
10	20	25	25	25	25	25	20	10
10	20	20	20	20	20	20	20	10
10	10	10	10	10	10	10	10	10

1 Mile
Scale

Core Area:	1 sq. mile	=	100 ChamP™ 25 Multilure®
1 mile buffer:	8 sq. miles	=	400 ChamP™
2 mile buffer:	16 sq. miles	=	400 Jackson
3 mile buffer:	24 sq. miles	=	480 Jackson
4 mile buffer:	32 sq. miles	=	320 Jackson
Total traps:	81 sq. miles	=	1,725 traps

FIGURE 2.

NOTE: All sticky traps in the core square mile and in the 1st buffer miles are ChamP™ traps. The remaining delimitation area may include the existing detection Jackson traps as part of the required totals.

INSPECTION FREQUENCY:

Delimitation Survey: Inspect traps daily in the core square mile during the first week. Traps in the eight square miles surrounding the core are serviced every two days. All other traps should be checked at least once within the first week.

HOSTS: The selection of the best host at each trap location is the most important phase of an effective trapping program. Priority must be given to hosts with mature fruit as listed in the Host Preference List.

Host Preference List

(with nearly mature or mature fruit and foliage)

Class I Hosts

(Exceptional Hosts)

Apricot *
Coffee *
Nectarine *

Peach *

Class II Hosts

(Good Hosts)

Calamondin
Catalina cherry
Cherimoya
Guava (*Psidium* spp.)
(i.e.: Mexican guava,
strawberry guava, etc.)
Holly-leaved cherry

Kumquat
Loquat
Papaya
Persimmon
Sour orange
Tangerine
White sapote

<u>Class III Hosts</u> (Acceptable Hosts)	Apple	Lime	Plum
	Avocado	Mango	Quince
	Cherry	Orange	Tangelo
	Common jujube	Pear	
	Fig	Pineapple guava	
	Grapefruit	(<i>Feijoa sellowiana</i>)	
	Kaffir plum	Pummelo	
<u>Class IV Hosts</u> (Lesser Hosts)	Lemon	Pomegranate **	
	Olive	Walnut ***	

* Does not need mature fruit. Excellent host when fruit is two-thirds or more developed.

** A host only when cracked or injured.

*** A host only when husk is fleshy (not a host when husk is split or dried).

SELECTION OF TRAPPING SITES: Selection of a trap site will depend on two main criteria: a suitable host tree and uniform trap distribution throughout the assigned area. First consideration should be given to the availability of suitable hosts with fruit. A suitable host can be defined as one of the listed host plants with ripe fruit and foliage, and one that meets the criteria for trap placement as described under "Hanging the Trap." If there is a choice between two or more possible trap locations with hosts of equal status, preference should be given to the site that has multiple hosts, either of the same variety or different varieties. However, shade and shelter, particularly in hot weather, also influence host selection by fruit flies. Thus, a tree with good foliage near (within twenty feet) a sparsely foliated host tree with fruit may be a preferable site to hang a trap. Or, if there are fruiting host trees chosen at a location that are too small, then a trap may be placed in a nearby non-host tree if it provides proper height and shade.

Special Considerations: At a high trap density, some areas may have a limited number of host trees with fruit. When this occurs, consideration should be given to placing the trap in a host tree with foliage and evidence of **abundant honeydew**. Honeydew is a sweetish, clear excretion produced by certain insects such as aphids, scale insects, mealybugs, and whiteflies. When present, it usually accumulates on the foliage and is a good food source for adult fruit flies. The presence of black sooty mold on the foliage indicates honeydew is present.

HANGING THE TRAP: Traps should be placed in the upper 1/2 to 1/3 of the tree canopy, about two feet from the outer ends of the branches. Maintain a space of 12 inches to 18 inches around the trap; foliage and ripening fruit should surround the trap beyond that distance, particularly to the bottom and sides. Traps should never be hung below the foliage canopy, nor should they be closer than four feet to the ground.

Be sure the trap is visible in filtered sunlight. Direct sun is acceptable as long as the other criteria for placement are met. Use the south (preferable), east or west sides of trees. In extremely hot areas, traps should be rotated to the north side during the hotter months. Position the trap so that a horizontal line parallel to the sticky surfaces intersects the trunk of the tree (Fig. 3).

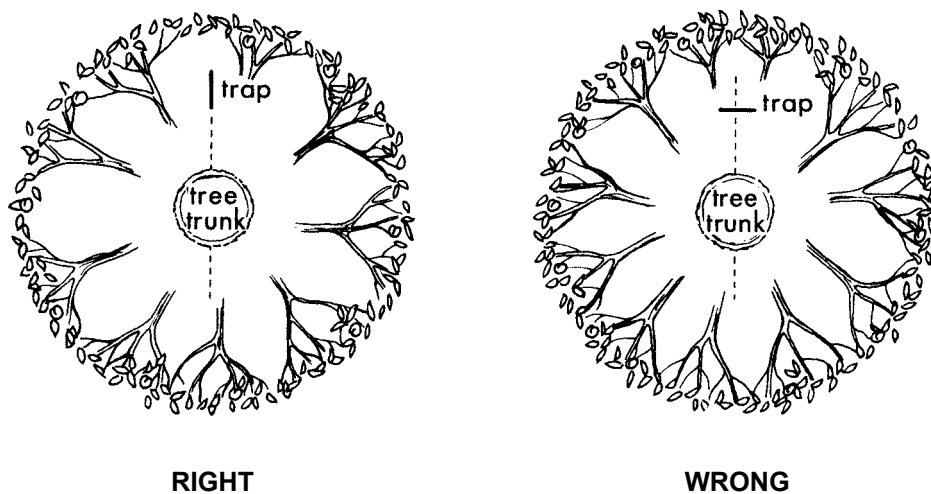


FIGURE 3. - TRAP POSITION WITHIN THE TREE AS SEEN FROM ABOVE

TRAP INSPECTION AND SERVICING: When inspecting traps, the following steps should be taken:

1. Remove the trap from the tree.
2. Examine the **entire** area of stickum on both sides of the trap. Do not neglect to examine the border areas.
3. Remove leaves and debris from stickum as flies could be beneath these objects. Be certain that the sticky surface is not rendered less effective by dust or debris. The stickum must remain optimally sticky to capture flies.
4. Write trap placement data on the inside and top of the trap. Put service dates on the outside of the trap. Replace trap every four weeks or more often if the trap becomes dirty.
5. Always use a new trap when it is relocated. Mark the new trap with the trap number and placement date on both halves.

COLLECTION AND SUBMISSION OF SAMPLES: When collecting samples for identification, the following steps should be taken:

1. Pull open the tear strip along the folded flap at the top of the trap. Remove the trap hanger and the attractant. Invert the trap so that the sticky sides are facing inward, but not touching. Refold the top flap and hold it in place with a paper clip or rubber band. This will secure the trap in an inside-out position and prevent damage to any insects caught in the adhesive.
2. Place the trap in a #4 paper bag or zip shut plastic bag. Staple or include the Standard Form 65-020, "Pest and Damage Record" (PDR) or equivalent "Project Submission Form" to the outside of the bag. Specimens submitted to Sacramento may be cut from the sticky insert and placed in a dry vial for submission. Be sure the identification slip and the outside of the package are marked "Rush." Include the trap number in the "Entomology" section of the PDR Form.

BAITING INTERVAL: Since evaporation of the lure is temperature dependent, the rebaiting schedule will depend upon the weather. Some guidelines are given below; however, trapping supervisors will have to be alert to the possibility that their particular situation may require different schedules (see table below).

Season	Solid Lure (2 Grams)	Solid Lure (4 Grams)
Spring-Summer (Daytime highs of 70° to 90° F)	6 weeks	10 weeks
Hot Summer (Daytime highs 90° F or over)	4 weeks	6 weeks
Winter	12 weeks	18 weeks

TRAP RELOCATION: Trimedlure has a limited drawing range. Therefore, a trap cannot be expected to effectively cover the entire area to which it is assigned from a single location. To overcome the limitations of the lure, the trap **MUST** be relocated. Relocations **MUST** be made when the fruit at the trap site is gone.

PROGRAM: Mediterranean Fruit Fly (Medfly) Trapping

TYPE OF TRAP: Jackson Trap

The delta-shaped Jackson trap is made of plastic-coated cardboard. The solid lure plug is contained in a plastic cage suspended from the inside of the trap (Fig. 1). A sticky insert on the bottom captures flies.

The trap consists of five parts: trap body, insert, basket, solid lure, and trap hanger. Trap hangers are reusable and should be saved.

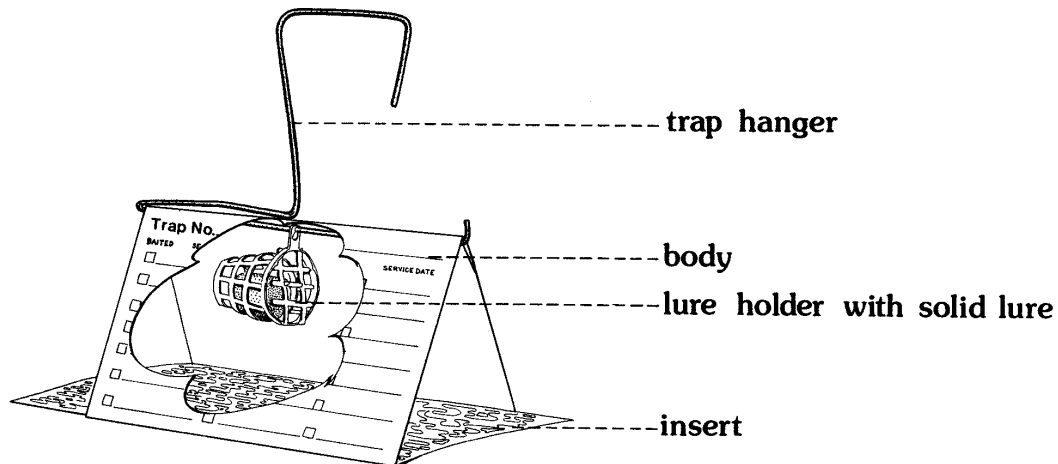


FIGURE 1. JACKSON TRAP



FIGURE 2. JACKSON TRAP

ATTRACTANT: Trimedlure (TML)

This lure acts primarily as a male attractant. When there is a high population level or an absence of males, females may enter the trap. There is no insecticide in the lure. A reddish pigment has been added as an identifying color.

TRAPPING SEASON: Southern California - Year-round, subject to host availability.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Imperial County - November through May. Subject to host availability, full deployment should be accomplished by November 1. Traps should be removed during the first servicing after May 31.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Coachella Valley - September through June. Subject to host availability, full deployment should be accomplished by September 1. Traps should be removed during the first servicing after June 30.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Southern San Francisco Bay - April through November. Subject to host availability, full deployment should be accomplished by April 1. Traps should be removed during the first servicing after November 30.*

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

All Other Areas - May through October. Subject to host availability, full deployment should be accomplished by May 1. Traps should be removed during the first servicing after October 31.*

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

* Some counties may have a much shorter season due to cooler climates and lack of suitable hosts.



FIGURE 6.

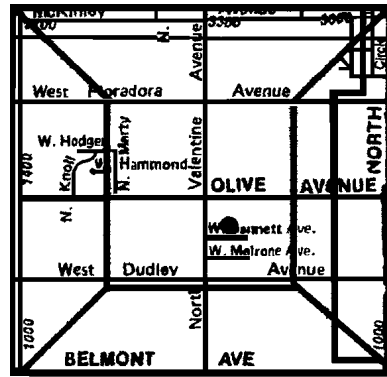


FIGURE 7.

Delimitation Survey - When a Medfly is collected in an area, trimedlure baited traps are placed in a 100-50-25-20-10 per-square-mile trap array sequence over 81 square miles. Traps in the core mile and the surrounding eight miles will be ChamP™ traps baited with trimedlure. Additionally, 25 Multilure Traps (MT) baited with the Heath three component lure (ammonium acetate, putrescine, and trimethylamine) will be placed in the core mile (Fig. 8). The MT traps are in addition to the detection McPhail traps baited with either torula yeast or Nu-Lure (Table 1, MP-3) already in place. Trap densities within the core square mile are increased within 24 hours. All traps within the 81 square mile area should be in place within 72 hours (see action plan for Medfly revised December 1999).

In the situation that an incomplete or unidentifiable fruit fly specimen is found, an alternative 1 mile delimitation is completed using the traps and numbers listed below for a “Core Area.”

MEDFLY DELIMITATION TRAPS PER SQUARE MILE

10	10	10	10	10	10	10	10	10
10	20	20	20	20	20	20	20	10
10	20	25	25	25	25	25	20	10
10	20	25	50	50	50	25	20	10
10	20	25	50	25/100	50	25	20	10
10	20	25	50	50	50	25	20	10
10	20	25	25	25	25	25	20	10
10	20	20	20	20	20	20	20	10
10	10	10	10	10	10	10	10	10

1 Mile Scale

CHAMP™, JACKSON, & MULTILURE TRAP TOTALS

Core Area:	1 sq. mile	=	100 ChamP™
		=	25 Multilure®
1 mile buffer:	8 sq. miles	=	400 ChamP™
2 mile buffer:	16 sq. miles	=	400 Jackson
3 mile buffer:	24 sq. miles	=	480 Jackson
4 mile buffer:	32 sq. miles	=	320 Jackson
Total:	81 sq. miles	=	1,725 traps

FIGURE 8.

INSPECTION FREQUENCY: Detection Survey - Once every 14 days with the following exception:

1. Once a month for rural trapping. (See also MF-8 "Trap Relocation").

Delimitation Survey - Servicing is to be conducted daily in the core square mile during the first week. Traps in the eight square miles surrounding the core are serviced every two days. All other traps should be checked at least once within the first week.

HOSTS: The selection of the best host at each trap location is the most important phase of an effective detection program. Priority must be given to hosts with mature or nearly mature fruit as listed in the Host Preference List.

Host Preference List

(with nearly mature or mature fruit and foliage)

<u>Class I Hosts</u> (Exceptional Hosts)	Apricot * Coffee* Nectarine *	Peach *	
<u>Class II Hosts</u> (Good Hosts)	Acerola Calamondin Catalina cherry Cherimoya Guava (<i>Psidium</i> spp.) (i.e.: Mexican guava, strawberry guava, etc.)	Holly-leaved cherry Kumquat Loquat Papaya Persimmon Sour orange Tangerine	White sapote
<u>Class III Hosts</u> (Acceptable Hosts)	Apple Avocado Common jujube Cherry Fig Grapefruit Jaboticaba Kaffir plum	Lime Longan Mango Medlar Orange Pear Pineapple guava (<i>Feijoa sellowiana</i>)	Pummelo Plum Quince Sapodilla Tangelo Yellow Oleander
<u>Class IV Hosts</u> (Lesser Hosts)	Lemon Lychee	Olive Pomegranate **	Walnut ***

* Does not need mature fruit. Excellent host when fruit is two-thirds or more developed.

** A host only when cracked or injured.

*** A host only when husk is fleshy (not a host when husk is split or dried).

SELECTION OF TRAPPING SITES: Selection of a trap site will depend on two main criteria: a suitable host tree and uniform trap distribution as traps are moved throughout the assigned area. First consideration should be given to the availability of suitable hosts with fruit. A suitable host can be defined as one of the listed host plants with mature or nearly mature fruit and foliage, and one that meets the criteria for trap placement as described under “Hanging the Trap.” If there is a choice between two or more possible trap locations with hosts of equal status, preference should be given to the site that has multiple hosts, either of the same variety or different varieties. However, shade and shelter, particularly in hot weather, also influence host selection by fruit flies. Thus, a tree with good foliage near (within 20 feet) a sparsely foliated host tree with fruit may be a preferable site to hang a trap. Or, if there are fruiting host trees chosen at a location that are too small, then a trap may be placed in a nearby (within 20 feet) non-host tree if it provides proper height and shade. **When traps are piggybacked with other trap types, always give preference to sites with hosts available for all trap types.**

Special Considerations: At a high trap density, some areas may have a limited number of host trees with fruit. When this occurs, consideration should be given to placing the trap in a host tree with foliage and evidence of **abundant honeydew**. Honeydew is a sweetish, clear excretion produced by certain insects such as aphids, scale insects, mealybugs, and whiteflies. When present, it usually accumulates on the foliage and is a good food source for adult fruit flies. The presence of black sooty mold on the foliage indicates honeydew is present.

HANGING THE TRAP: Assemble the trap by first writing the trap number and date of deployment on both the trap body and sticky insert. The trap body is then opened; the bottom is pushed upward and firm pressure is applied laterally. **THIS IS IMPORTANT!** When pressure is released, the trap bottom will remain flat. The sticky insert is slid into place. It will fit tightly, if properly done. The lure holder and lure are then prepared according to instructions on MF-9. The trap is now fully assembled (see Figure 1).

Place the trap in the warmest part of the tree in open shade (**not in full sunlight at any time**). During extremely hot weather, traps may need to be moved to other areas of the tree. Traps should be placed in the upper 1/2 to 1/3 of the tree canopy, 1/2 to 2/3 the distance from the trunk to the outer edge of the foliage. Lower levels are acceptable only if it is impossible to find a desired spot higher in the tree. Before placing a trap at lower levels in a tree, safety to children and the security of the trap must be considered.

It should not be placed in dense foliage that may block the trap entrance or give the fly a resting place that would prevent it from entering the trap.

Maintain a foliage-free space of 12 to 18 inches around the trap, but be sure foliage and ripening fruit surround the trap beyond that distance, particularly to the bottom and sides. Traps should never be hung below the foliage canopy, nor should they be closer than four feet to the ground (Fig. 9).

Citrus trees with compact foliage may present a problem. However, the trap should still be placed near the outer periphery of the tree near the fruit. Usually a small break in the foliage can be found where leaves and branches can be manipulated away from the entrances to the trap. Do not place the trap inside of the tree beyond the foliage.



**CORRECT
PROPER HEIGHT**



**INCORRECT
PLACED TOO LOW**

FIGURE 9.

TRAP INSPECTION AND SERVICING: When inspecting traps, the following steps should be taken:

1. Remove the trap from the tree.
2. Pull out insert and examine entire area of stickum.
3. Remove leaves and debris from stickum as flies could be beneath these objects. Be certain that the sticky surface is not rendered less effective by dust or debris. The stickum must remain optimally sticky to capture flies.
4. If no flies are found, replace insert, date trap and rebait, if necessary, according to the recommended baiting interval and suggested handling techniques.
5. Change inserts every month or more often as needed. Always change the insert when relocating the trap. Mark new inserts with the trap number and placement date.
6. Replace lure according to the table below. Avoid contamination when handling baskets and plugs.
7. Trap bodies eventually lose their shape, become filled with trap servicing data, or otherwise deteriorate. When this occurs, they should be replaced.

COLLECTION AND SUBMISSION OF SAMPLES: The entire trap insert containing the suspect fly should be collected for supervisory review. Specimens submitted to Sacramento should be cut from the sticky insert and placed in a dry vial for submission. Use care to prevent damage to the specimen. Send the specimen to Sacramento with a Standard Form 65-020, "Pest and Damage Record" (PDR). Be sure the identification slip and the outside of the package are marked "RUSH." Include the trap number in the "Entomology" section of the PDR Form.

BAITING INTERVAL: Since evaporation of the lure is temperature dependent, the rebaiting schedule will depend upon the weather. Some guidelines are given below; however, trapping supervisors will have to be alert to the possibility that their particular situation may require different schedules (see table below).

Season	Solid Lure (2 Grams)	Solid Lure (4 Grams)
Spring-Summer (Daytime highs of 70° to 90° F)	6 weeks	10 weeks
Hot Summer (Daytime highs 90° F or over)	4 weeks	6 weeks
Winter	12 weeks	18 weeks

TRAP RELOCATION: Trimedlure has a limited drawing range. Therefore, a trap cannot be expected to effectively cover the entire area to which it is assigned from a single location. To overcome the limitations of the lure, the trap **MUST** be relocated. Relocations **MUST** be made when fruit at the trap site is gone. No trap should exceed six weeks at one location over a 12 month period when suitable alternate host sites are available. When relocation sites are limited, traps can remain longer than six weeks, as long as fruit is available at the trap site. Relocations should provide for moving the trap evenly throughout its assigned area, with a minimum relocation distance of 500 feet. Rural traps should be relocated monthly when serviced and moved to a new section in its assigned six square mile area.

For Southern California and the Southern San Francisco Bay Area, a minimum of 100 traps sites per square mile are to be identified. No less than 80 of these sites shall be used each year. The remaining 20 sites should be factored into the relocation plan for the next year. Newly identified sites may be added at any time.

For the other urban areas, a minimum of 50 trap sites per square mile are to be identified. No less than 25 of these sites shall be used each year. In the second year, utilize 60 percent of the trap sites not used, and the remaining 40 percent in the third year. Combine the new trap sites with some of the original 25 trap sites to assure use of a total of 25 annually. Newly identified sites may be included at any time.

For efficient and effective trapping, the trapper should schedule relocations in advance. If a desired fruiting host tree cannot be located, either because of lack of hosts or lateness of the season, then a trap should not be placed or maintained. This means that certain square miles may have fewer traps than the proposed level.

**Trimedlure: t BUTYL - 4 (or 5) - chloro -
2-methyl cyclohexane carboxylate**

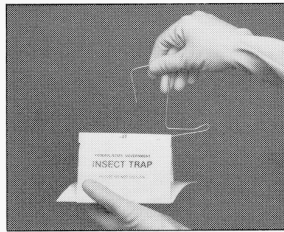
A pheromone trap product for use in pheromone trap applications.

This product is specific to the Mediterranean Fruit Fly (*Ceratitis capitata*).

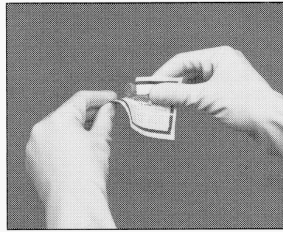
WARNING! IRRITATES EYES. Avoid eye contact. **IN CASE OF EYE CONTACT**, flush eyes immediately with water for fifteen minutes. Obtain medical attention. Dispose of in an approved manner for general organic chemical waste materials. Before handling please read the Materials Safety Data Sheet for detailed use and health information.

STORE IN A COOL PLACE - AVOID HEAT!

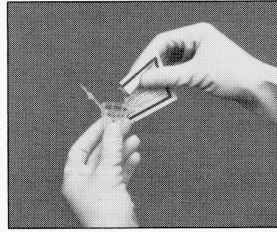
SUGGESTED HANDLING TECHNIQUES for baiting the Jackson trap



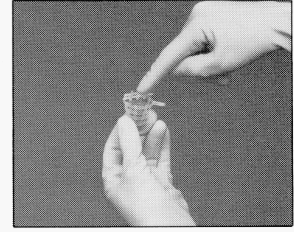
1 Remove bar from the trap



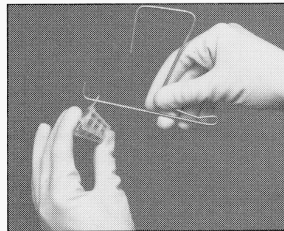
2 Tear open the pouch - do not touch the lure



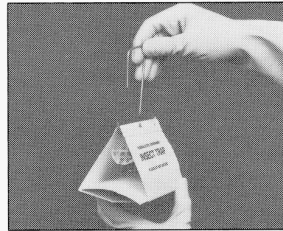
3 Hold the basket and empty the lure into the basket



4 Close the gate



5 Place basket onto the bar



6 Place loaded trap in appropriate monitoring location

To rebait: remove trap from tree - empty spent plug into appropriate waste container. Insert new plug as per above.

SHIPPING LIMITATION: None

DOT CLASSIFICATION: None

PACKAGING

Magnet TML 70-0 Lures are individually packaged in a 3½" × 3¾" airtight, impermeable pouch (4 gms) and shipped in cases of 400.

STORAGE AND SHELF LIFE

When stored at room temperature in sealed packages, AgriSense certifies that Magnet TML 70-0 Lures will meet sales specifications for a period of 12 months from date of shipment.

MATERIALS SAFETY DATA SHEET

Materials Safety Data Sheet on the Magnet TML 70-0 Lures may be obtained by writing or calling AgriSense, 4230 West Swift, Suite 106, Fresno, CA 93722, Telephone (209) 276-7037.

WARRANTY

PLEASE READ CAREFULLY:

AgriSense believes that the information in this publication is an accurate description of the typical characteristics and/or uses of the Magnet TML 70-0 Lure, but it is the user's responsibility to thoroughly test the product in specific applications to determine its performance, efficacy and safety.

Unless AgriSense provides the user with a specific written warranty of fitness for a particular use, AgriSense's sole warranty is that the product or products will meet AgriSense's then current sales specifications. AgriSense SPECIFICALLY DISCLAIMS ANY OTHER EXPRESS OR IMPLIED

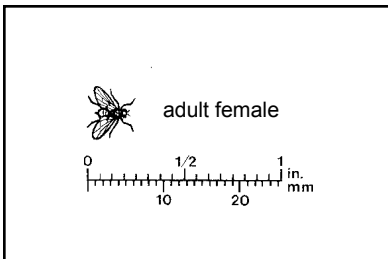
WARRANTY, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND OF FITNESS FOR USE. The user's exclusive remedy and AgriSense's sole liability for breach of warranty is limited to refund of the purchase price or replacement of any product shown to be other than as warranted, and AgriSense expressly disclaims any liability for incidental or consequential damages.

This product is not a registered pesticide. Before handling, read the Product and Materials Safety Data Sheet for detailed use and health information.

AgriSense polymer entrapment systems are protected by patents and patents pending.



Photo by Jack Clark, University of California, Agriculture and Natural Resources



MEDITERRANEAN FRUIT FLY
Ceratitis capitata (Wiedemann)

PROGRAM: Melon Fly (ML) Trapping

TYPE OF TRAP: Jackson Trap

The delta-shaped Jackson trap is made of plastic-coated cardboard (Fig. 1). Lure is placed on a cotton roll wick, supported inside the trap by a wire wick holder. A sticky insert on the bottom captures flies.

The Jackson trap consists of five parts: trap body, insert, wick holder, wick, and trap hanger (Fig. 2). Trap hangers are reusable and should be saved.



FIGURE 1. JACKSON TRAP

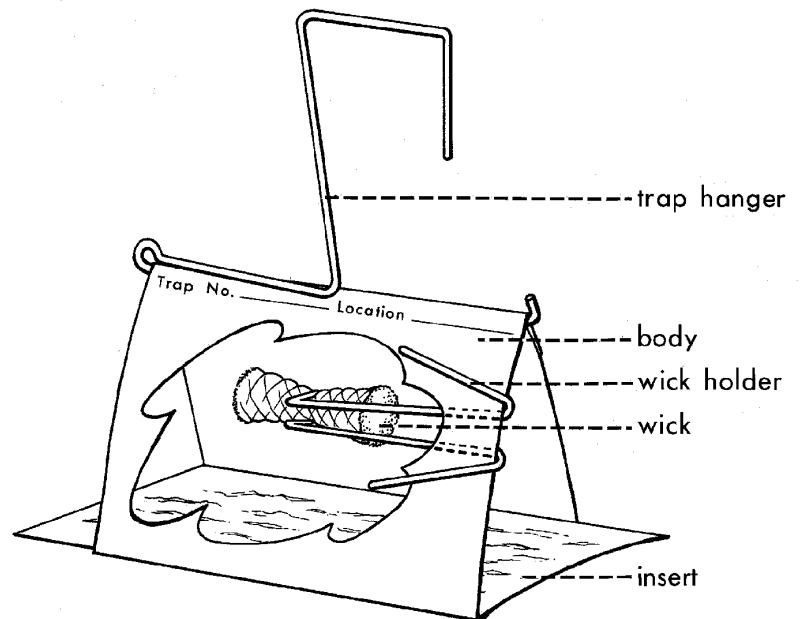


FIGURE 2. JACKSON TRAP

ATTRACTANTS: Cue-lure (5% dibrom is added to the lure to stun the flies). This lure acts primarily as a male attractant. When there is an absence of males, females may enter the trap.

Color variation in the dibrom/lure mixtures is due to the reaction of the free bromine radical. Dibrom varies in color from light brown to dark brown. The color of the material does not interfere with its effectiveness. Improper storage and handling can cause the dibrom to break down. Users should order only as much material as needed during the year. Keep the dibrom/lure mixture in closed, darkened bottles in a cool place.

CUE-LURE		
Trap Component	Stimulus	Response
Wick	Cue-lure	Sexual response of male melon fly

Special instructions for the use of Cue-lure containing dibrom:

1. A copy of the Special Local Need (SLN) registration must be carried by each trapper using the lure (page xxx).
2. The SLN instructions must be followed.
3. Pesticide labels must be carried by the trapper.
4. The following label should be attached to all service containers which contain dibrom as an addition to the lure. Complete the label by adding a local phone number where emergency calls can be directed.

<p style="text-align: center;">DANGER NALED + CUE-LURE</p> <p>Date Pkgd: _____ CA Dept. of Food & Agriculture 13915 Saticoy St. Panorama City, CA 91402 (818) 901-0719 IN CASE OF EMERGENCY, NOTIFY:</p>

5. The following additional label must be placed on the trap. The current phone number for the Poison Control Center is 1-800-222-1222.

Cotton wick contains 5 ml of 5% Naled (an organophosphorous insecticide), and Cuelure® (an insect attractant).

May be irritating to eyes and skin. If in eyes, immediately flush with water. Wash skin with soap and water. Contact a physician if irritation persists. For additional information, contact \ Para más información llame al:

California Poison Control System \ El Sistema de California Para el Control de Envenenamiento: 1-800-222-1222

La mecha de algodón contiene 5 ml de 5% Naled (un pesticida organofosforado), y Cuelure® (un atrayente de insectos).

Puede causar irritación en los ojos y la piel. En caso de contacto lávese los ojos inmediatamente con agua. Lávese su piel con agua y jabón. Si la irritación persiste comuníquese con un médico.

TRAPPING SEASON: Southern California - Year-round, subject to host availability.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Imperial County - November through May. Subject to host availability, full deployment should be accomplished by November 1. Traps should be removed during the first servicing after May 31.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Coachella Valley - September through June. Subject to host availability, full deployment should be accomplished by September 1. Traps should be removed during the first servicing after June 30.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Southern San Francisco Bay Area - June through October. Subject to host availability, full deployment should be accomplished by June 1. Traps should be removed during the first servicing after October 31.

Other Urban Areas - June through October. Subject to host availability, full deployment should be accomplished by June 1. Traps should be removed during the first servicing after October 31.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Mountain and northern counties and rural areas are not to be trapped.

TRAP DENSITY: Detection Survey - Southern California and Southern San Francisco Bay Area. - Use five traps per square mile in urban and rural residential areas of 300 or more homes per square mile (except Alameda, Contra Costa, Orange, Riverside, southern San Luis Obispo, Santa Barbara, Santa Clara, and Ventura counties should use five traps per square mile in urban areas and follow the schedule listed for rural residential areas on page MF-3).

Other Urban Areas - Use two traps per square mile in urban and rural residential areas of 300 or more homes per square mile, with the following exceptions: Mendocino, Lake, Amador and Calaveras counties use one trap per square mile. In Fresno, Kern, Kings, Madera, Marin, Merced, Sacramento, San Francisco, northern San Luis Obispo, Santa Cruz, San Joaquin, Stanislaus, Tulare, and Yuba use two traps per square mile in urban areas. In rural residential areas use an equivalent number of traps per square mile as outlined below.

Residences/Square Mile	Number of Traps
25 - 250	1
251 - up (urban)	2

Traps should be placed at a residence. If no host exists at a residence, then use a host tree closest to a residence.

Delimitation Survey - When a melon fly is trapped, Jackson traps with Cue-lure plus dibrom will be set out in a 50-25-15-10-5 per-square-mile trapping array over an 81-square-mile area. A total of 890 Jackson traps will be required. In addition, 25 McPhail traps baited with either torula yeast or Nu-Lure (Table 1, MP-3) will be deployed in the square mile around the find (Fig. 3). Deployment of all traps in the core mile should be made within 24 hours.

In the situation that an incomplete or unidentifiable fruit fly specimen is found, an alternative 1 mile delimitation will be completed using the traps and numbers listed below for a "Core Area."

**MELON FLY DELIMITATION
TRAPS PER SQUARE MILE**

JACKSON & MCPHAIL TRAP TOTALS

5	5	5	5	5	5	5	5	5
5	10	10	10	10	10	10	10	5
5	10	15	15	15	15	15	10	5
5	10	15	25	25	25	15	10	5
5	10	15	25	$\frac{50}{25}$	25	15	10	5
5	10	15	25	25	25	15	10	5
5	10	15	15	15	15	15	10	5
5	10	10	10	10	10	10	10	5
5	5	5	5	5	5	5	5	5



Core Area:	1 sq. mile =	50 Jackson	25 McPhail
1 mile buffer:	8 sq. miles =	200 Jackson	
2 mile buffer:	16 sq. miles =	240 Jackson	
3 mile buffer:	24 sq. miles =	240 Jackson	
4 mile buffer:	32 sq. miles =	160 Jackson	
Total:	81 sq. miles =	915 traps	

FIGURE 3.

INSPECTION FREQUENCY: Detection survey - once every two weeks.

Delimitation Survey - Servicing is to be conducted daily in the core square mile during the first week. Traps in the eight square miles surrounding the core are serviced every two days. All other traps should be checked at least once within the first week. The Nu-Lure mixture should be reused after each servicing and replaced on a weekly basis.

HOSTS: Cucurbits (melon, squash, cucumber, pumpkin, etc.)
Tomatoes
Green beans
Chili pepper
Rarely, stone fruits and citrus

SELECTION OF TRAPPING SITES: First consideration when selecting a trap site for a melon fly trap should be given to the availability of prime hosts, i.e., melons, squash, cucumber, and pumpkin. Place the trap in a broadleaf tree (preferably a fruit tree) as close as possible to a prime host. In areas lacking sufficient prime hosts near which to place the traps, secondary hosts such as citrus and stone fruits may be selected as trap sites. Do not use conifers. **When traps are piggybacked with other trap types, always give preference to sites with hosts available for all trap types.**

Special Considerations: At a high trap density, some areas may have a limited number of host trees with fruit. When this occurs, consideration should be given to placing the trap in a host tree with foliage and evidence of **abundant honeydew**. Honeydew is a sweetish, clear excretion produced by certain insects such as aphids, scale insects, mealybugs, and whiteflies. When present, it usually accumulates on the foliage and is a good food source for adult fruit flies. The presence of black sooty mold on the foliage indicates honeydew is present.

HANGING THE TRAP: Assemble the trap by first writing the trap number and date of deployment on both the trap body and sticky insert. The trap body is then opened; the bottom is pushed upward and firm pressure is applied laterally. **THIS IS IMPORTANT!** When pressure is released, the trap bottom will remain flat. The sticky insert is slid into place. It will bow up or down slightly and fit tightly, if properly done (Fig. 2).

Place the trap just out of reach, 1/2 to 2/3 the distance from the trunk to the outer edge of the foliage. It should not be placed in dense foliage that may block the trap entrance, or give the fly a resting place that would prevent it from entering the trap. Maintain a foliage-free space of 12 to 18 inches around the trap. Traps should not be hung below the foliage canopy, nor should they be closer than four feet to the ground (Fig. 4).

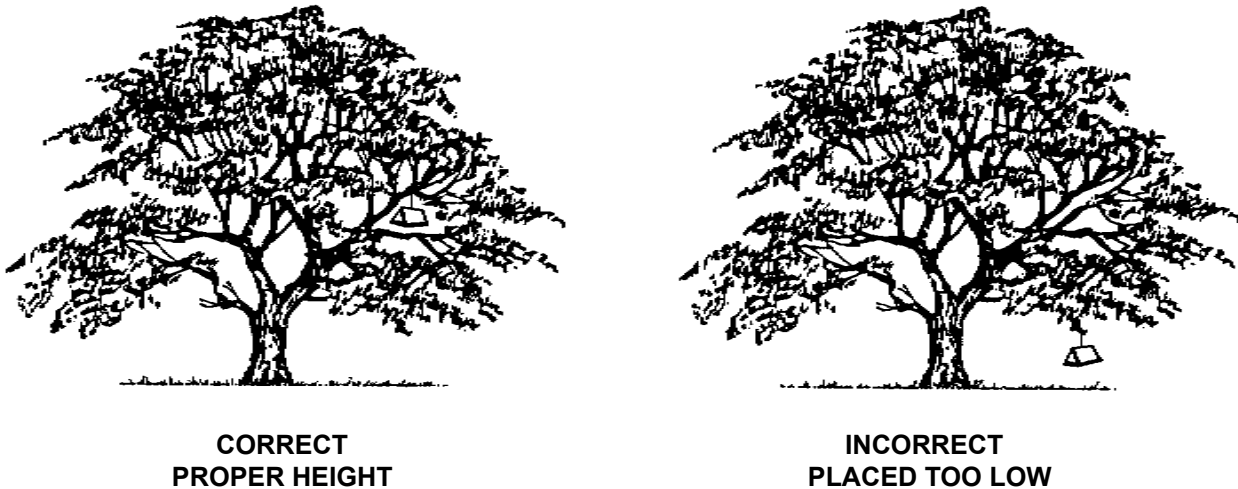


FIGURE 4.

TRAP INSPECTION AND SERVICING: When inspecting traps, the following steps should be taken:

1. Remove the trap from the tree.
2. Pull out insert and examine entire area of stickum.
3. Remove leaves and debris from stickum as flies could be beneath these objects. Be certain that the sticky surface is not rendered less effective by dust or debris. The stickum must remain optimally sticky to capture flies.
4. If no flies are found, replace insert, date trap, bait as appropriate, and replace in tree.
5. Change inserts every month or more often as needed. Always change the insert when relocating the trap. Mark new inserts with the trap number, placement date, and "ML."
6. Wicks should be changed every two months or when relocated. Since water (moisture) can physically force the lure out of the wicks and contaminate the traps, wicks which become wet from rain, sprinklers, etc. should be changed.
7. Do not pre-bait wicks until the day they are needed.
8. Trap bodies eventually lose their shape, become filled with trap servicing data, or otherwise deteriorate. When this occurs, they should be replaced.

Cue-lure is to be kept in a darkened bottle. A calibrated medicine dropper is recommended for application of the lure to each end of the wick. In accordance with the SLN, the wick is initially baited with 5 ml. of lure. One half of the lure is applied to each end of the wick. Rebaiting of the wick is not recommended. This lure contains dibrom to ensure that flies are incapacitated and held in the stickum. The following illustration shows correct positioning of the trap for baiting (Fig. 5). All baiting of wicks with lure containing dibrom should be done at a work station where appropriate safety equipment is available for use.

The following baiting procedure for oriental fruit fly (OF) and melon fly (ML) traps has been established so that the actual application is performed in the safest possible manner and to minimize the possibility of baiting one trap type with the wrong lure.

1. DO NOT BAIT IN THE FIELD.

2. Prior to baiting, determine the number of new OF and ML traps needed for the day. Assemble the required number of Jackson traps (plus an additional 10%). Open a trap body, place an unopened insert into the body to keep it open and install a wick holder and wick.
3. Prior to any lure being opened, place the appropriate 1% dibrom concentration labels on the Jackson trap bodies designated to be OF traps. Likewise, place the 5% dibrom concentration labels on the trap bodies soon to be ML traps. **KEEP THESE DIFFERENTLY LABELED, UNBAITED TRAP BODIES SEPARATED!** Place any other required trap labeling on the trap at this time as well.
4. When baiting OF and ML traps, never bait both trap types at the same time in the same area. Either bait one type first and then the other or have two trappers baiting in separate areas.
5. In a well-ventilated area, bait the traps over paper towels or some other disposable, absorbent material in the event of an accidental spill.
6. Always wear chemical-resistant gloves and eye protection when handling the lure/dibrom combination before it has been applied to the wick. After applying the material, rinse your gloves with soap and water before you take them off.
7. After all of the traps are baited, each trapper collects the number of baited traps required to perform all of the placements and/or rebaitings scheduled for that day in their route (plus an additional 10% to cover those traps needing unanticipated rebaiting). These correctly labeled, baited traps are placed into a large plastic bag and closed.
8. Once in the field and at the site of a trap needing baiting, remove the old trap from the tree, inspect the insert and remove the trap hanger. Place the trap hanger onto the new replacement trap, make all required notations on the new trap body and insert, and place the new trap into the host tree.
9. Place the old trap into another plastic bag at the trapping vehicle. Dispose of all old wicks as instructed by the trapping supervisor.

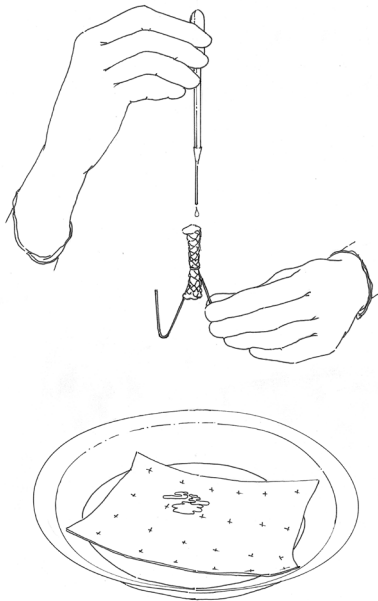


FIGURE 5.

AVOID CONTAMINATION

Never bait over trapping supplies.

Always bait over absorbent material. It is critical to avoid contamination with this lure. **CONTAMINATED FINGERS TRANSFER LURE. NO LURE CAN BE ALLOWED TO CONTAMINATE THE OUTSIDE OF THE TRAP.**

COLLECTION AND SUBMISSION OF SAMPLES: The entire trap insert containing the suspect fly should be collected for supervisory review. Specimens submitted to Sacramento should be cut from the sticky insert and placed in a dry vial for submission. Send the specimen to Sacramento with a Standard Form 65-020, "Pest and Damage Record" (PDR). Be sure the identification slip, and the outside of the package are marked "RUSH." Include the trap number in the "Entomology" section of the PDR Form.

BAITING INTERVAL: Replace the old wick with a newly baited wick every two months, or when relocated, throughout the trapping period.

TRAP RELOCATION:

Southern California - No trap should exceed six weeks at one location over a 12 month period when suitable host sites are available. When relocation sites are limited, traps can remain longer than six weeks, as long as fruit is available at the trap site.

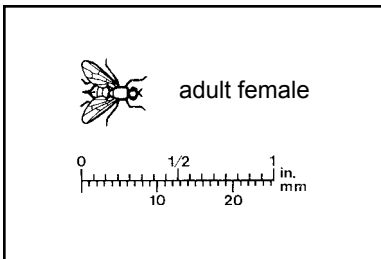
All other areas - Relocate once during the season prior to August 15.

Relocation **MUST** be made when fruit at the trap site is gone. Relocations should provide for moving the trap evenly throughout its assigned area, with a minimum relocation distance of 500 feet.

The trapper should schedule relocation sites in advance. If a desired fruiting host cannot be located, either because of lack of hosts or lateness of the season, then a trap should not be placed or maintained. This means that certain square miles may have fewer traps than the proposed level.



Photo by Jack Clark, University of California, Agriculture and Natural Resources



MELON FLY
Bactrocera cucurbitae (Coquillett)

PROGRAM: General Fruit Fly Trapping (Fruit trees and vegetable gardens)

TYPE OF TRAP: McPhail Trap

The McPhail trap (Fig. 1) is a glass trap with a water reservoir containing dissolved attractant compounds. Flies enter from below through the opening and drown in the solution.



FIGURE 1. MCPHAIL TRAP

ATTRACTANT: Torula yeast and borax pellets act as a food attractant.

TRAPPING SEASON: Southern California - Year-round in urban areas of southern California, except in Santa Barbara and Ventura counties. In these counties remove traps December through March. In southern San Luis Obispo County replace the McPhail traps for these months with ChamP™ traps.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Southern San Francisco Bay Area - April through November. Subject to host availability, full deployment should be accomplished by April 1. Traps should be removed during the first servicing after November 30.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Other Urban Areas - May through October. Subject to host availability, full deployment should be accomplished by May 1. Traps should be removed during the first servicing after October 31.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Imperial County - November through May. Subject to host availability, full deployment should be accomplished by November 1. Traps should be removed during the first servicing after May 31.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Coachella Valley - September through June. Subject to host availability, full deployment should be accomplished by September 1. Traps should be removed during the first servicing after June 30.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Mountain and northern counties and rural areas are not to be trapped.

TRAP DENSITY: Detection Survey - Southern California - Use five traps per square mile in urban areas (except Imperial, Orange, Riverside, southern San Luis Obispo, Santa Barbara, and Ventura counties should use five traps per square mile in urban areas and follow the schedule listed for rural residential areas on page MF-3).

Southern San Francisco Bay Area - Use five traps per square mile in urban areas (except Alameda, Contra Costa, and Santa Clara counties should use five traps per square mile in urban areas and follow the schedule listed for rural residential areas on page MF-3).

Southern San Joaquin Valley (Madera County and south) - Use three traps per square mile in urban areas. In rural residential areas use an equivalent number of traps per square mile as outlined below.

<u>Residences/Square Mile</u>	<u>Number of Traps</u>
25 - 50	1
51 - 300	2
301 - up (urban)	3

Traps should be placed at a residence. If no host exists at a residence, then use a host tree closest to a residence.

In Napa, San Francisco, Solano, Sonoma, and Yolo counties - Use two traps per square mile in urban areas. June through October - traps should be placed at garden sites with melon fly traps. At all other times, McPhail traps should be placed on properties separate from all other fruit fly traps.

In Marin, Merced, Sacramento, San Joaquin, Santa Cruz, and Stanislaus counties - Use two traps per square mile in urban areas. In rural residential areas use an equivalent number of traps per square mile as outlined below. June through October - traps should be placed at garden sites with melon fly traps. At all other times, McPhail traps should be placed on properties separate from all other fruit fly traps.

<u>Residences/Square Mile</u>	<u>Number of Traps</u>
25 - 250	1
251 - up (urban)	2

Traps should be placed at a residence. If no host exists at a residence, then use a host tree closest to a residence.

Delimitation Survey - In a delimitation or intensive trapping program for Mexican fruit fly (*Anastrepha ludens*), **McPhail/Multilure®** traps are placed over 81 square miles, in an 80-40-5-5-5 array. A total of 760 traps are involved (Fig. 2). If McPhail traps are used in the central nine square mile core, then use torula yeast pellets or a liquid mixture of Nu-Lure (9%), borax (5%), and water (86%) by weight (Table 1). Nu-Lure has previously been called SIB-7 (Staley's insect bait) or PIB-7 (protein insect bait). If Multilure® traps are deployed then all traps will be baited with the two-component lure of ammonium acetate (AA) and putrescine (PT). Refer to pages MT-4, "Hanging The Trap" and MT-5, "Trap Inspection and Servicing" and "Baiting Intervals" for specific procedures on trap deployment, inspection, servicing, and baiting. Trap density within the core square mile is increased within 24 hours.

For all other species, delimitation array should be 80-40-20-10-5 (Fig. 3).

In the situation that an incomplete or unidentifiable fruit fly specimen is found, an alternative 1 mile delimitation will be completed using traps and numbers listed below for a "Core Area."

Table 1: Nu-Lure Mixture

<u>Amounts of Material by Weight</u>	<u>Amounts for One Gallon of Mix</u>	<u>Amounts for Five Gallons of Mix</u>
Nu-Lure (9%)	268 ml. (9 fl. oz.)	1,340 ml. (45 fl. oz.)
Borax (5%)	186 g. (6.4 oz.)	930 g. (2 lbs.)
Water (86%)	3,200 ml. (107.5 fl. oz.)	16,000 ml. (17 qts.)

INSPECTION FREQUENCY: Detection Survey - Once every seven days with the following exception: those counties operating traps all year will perform servicing once every 14 days from December 1 through February 28.

Delimitation Survey - Servicing is to be conducted daily in the core square mile during the first week. The Nu-Lure or torula yeast mixture should be reused after each servicing and replaced on a weekly basis. Traps in the eight square miles surrounding the core are serviced every two days. All other traps should be checked at least once within the first week.

**MEXICAN FRUIT FLY
DELIMITATION SURVEY TRAPPING
TRAPS PER SQUARE MILE**

MULTILURE® / MCPHAIL TRAP TOTALS

5	5	5	5	5	5	5	5	5
5	5	5	5	5	5	5	5	5
5	5	5	5	5	5	5	5	5
5	5	5	40	40	40	5	5	5
5	5	5	40	80	40	5	5	5
5	5	5	40	40	40	5	5	5
5	5	5	5	5	5	5	5	5
5	5	5	5	5	5	5	5	5
5	5	5	5	5	5	5	5	5

1 Mile
Scale

Core Area:	1 sq. mile	=	80 traps
1 mile buffer:	8 sq. miles	=	320 traps
2 mile buffer:	16 sq. miles	=	80 traps
3 mile buffer:	24 sq. miles	=	120 traps
4 mile buffer:	32 sq. miles	=	160 traps
Total traps:	81 sq. miles	=	760 traps

FIGURE 2.

**DELIMITATION SURVEY TRAPPING
TRAPS PER SQUARE MILE**

MULTILURE® / MCPHAIL TRAP TOTALS

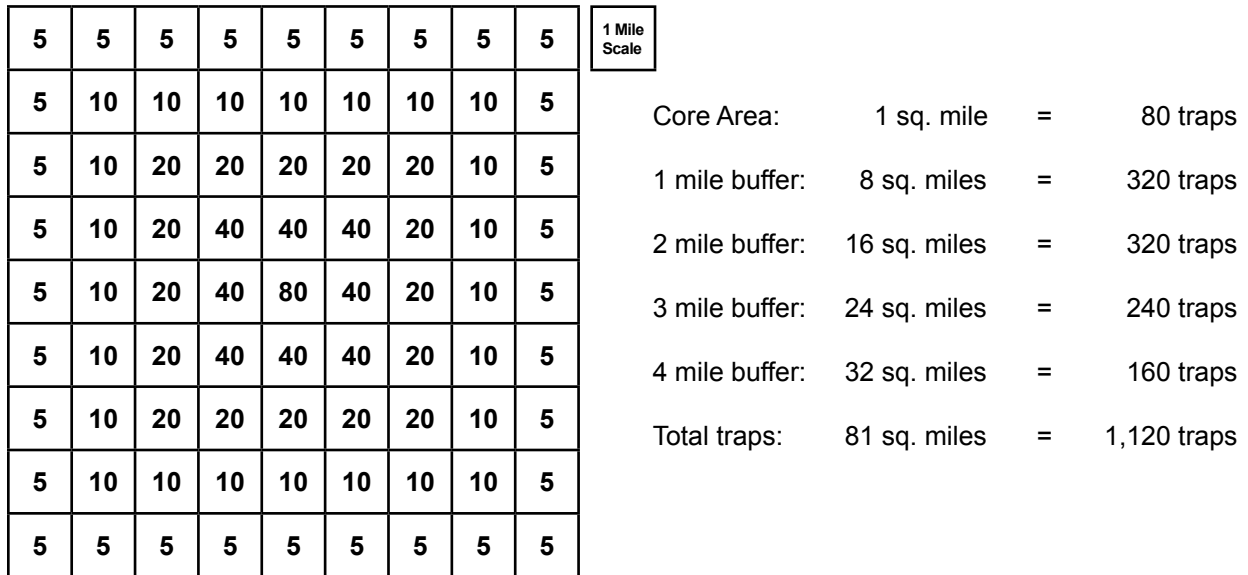


FIGURE 3.

HOSTS: The selection of the best host at each trap location is the most important phase of an effective detection program. Priority must be given to hosts which have nearly mature fruit as listed in the Host Preference List.

Mexican Fruit Fly Host Preference List
(with nearly mature or mature fruit and foliage)

<u>Class I Hosts</u> (Exceptional Hosts)	Common guava Grapefruit Mango	Nectarine Peach Pummelo	Sour orange Strawberry guava Sweet orange	Sweet lime Tangerine White sapote
<u>Class II Hosts</u> (Good Hosts)	Apple Avocado Citron	Coffee Loquat Papaya	Pear Persimmon Pineapple guava	Tangelo
<u>Class III Hosts</u> (Acceptable Hosts)	Cherimoya Lemon	Pomegranate	Quince	Trifoliate orange

Caribbean Fruit Fly Host Preference List
(with nearly mature or mature fruit and foliage)

<u>Class I Hosts</u> (Exceptional Hosts)	Common guava	Loquat	Strawberry guava	Surinam cherry
<u>Class II Hosts</u> (Good Hosts)	Calamondin	Kumquat	Nectarine	Peach
<u>Class III Hosts</u> (Acceptable Hosts)	Avocado Grapefruit Lime	Mango Papaya Pummelo	Sour orange Sweet orange Tangelo	Tangerine White sapote
<u>Class IV Hosts</u> (Lesser Hosts)	Cherimoya	Persimmon	Pomegranate	

General Fruit Fly Host Preference List

Primary hosts are vegetables; fruit trees are secondary hosts.

- Cucurbits (melons, squashes, cucumbers, pumpkins, gourds, etc.)
- Tomatoes
- Green beans
- Peppers
- Okra
- Eggplant
- Stone fruits
- Pome fruits
- Tropical fruits
- Citrus

For other *Anastrepha* spp., *Bactrocera* spp., and *Dacus* spp. and fruit flies in general, other fruit trees are acceptable for trapping if none of the hosts for Mexican fruit fly or Caribbean fruit fly are available at the appropriate fruiting stage.

SELECTION OF TRAPPING SITES: Selection of a trap site will depend on two main criteria: a suitable host, and uniform trap distribution throughout the assigned area. A suitable host can be defined as one of the listed host plants with foliage and nearly mature fruit, and one that is suitable for trap placement as described under "Hanging the Trap." However, shade and shelter, particularly in hot weather, also influence host selection by fruit flies. Thus, a densely foliated host tree without fruit may be preferable to a fruiting, sparsely foliated host tree. However, a well foliated, fruiting host tree will always be the tree of first choice. **When traps are piggybacked with other trap types, always give preference to sites with hosts available for all trap types.**

Special Considerations: At a high trap density, some areas may have a limited number of host trees with fruit. When this occurs, consideration should be given to placing the trap in a host tree with foliage and evidence of **abundant honeydew**. Honeydew is a sweetish, clear excretion produced by certain insects such as aphids, scale insects, mealybugs, and whiteflies. When present, it usually accumulates on the foliage and is a good food source for adult fruit flies. The presence of black sooty mold on the foliage indicates honeydew is present.

The two McPhail/Multilure® traps per square mile deployed for general fruit fly detection must be placed near primary hosts in the general fruit fly host preference list. Traps deployed in or near gardens for general fruit fly detection can utilize non-fruit trees to keep the trap as close as possible to the garden. In Southern California and the Bay Area, preference should always be given to garden sites where *Anastrepha* hosts are available.

In reference to the two traps assigned to gardens, maintain a uniform trap distribution. This can be achieved by alternating trap placement from the north/south subgrids in one mile to the east/west subgrid in the adjoining mile. Repeat this pattern over the entire trapping area (Fig. 4). However, host availability will always determine trap location

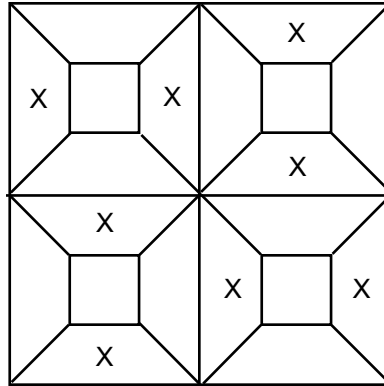


FIGURE 4.

HANGING THE TRAP: When installing the traps, add water to a level just below the inside lip of the trap so that minor tilting of the trap will not cause spillage. (NOTE: This is important. A splash of solution on the glass surface outside the reservoir will dry, leaving a protein residue. Dried proteins outside of the reservoir are arrestants and will prevent flies from entering the trap and drowning in the solution). Add three to six bait pellets. These pellets are affected by temperature, humidity, and the amount of water in the trap. The use of six pellets may cause a congealing of the solution. If this occurs, the number of pellets should be reduced by one pellet per servicing until the solution remains fluid between servicing. Place a date calendar on the trap hanger.

Place the trap in the warmest part of the tree in open shade (not in full sunlight at any time). During extremely hot weather, traps may need to be moved to other areas of the tree. Traps should be placed in the upper 1/2 to 1/3 of the tree canopy on a strong branch, 1/2 to 2/3 the distance from the trunk to the outer edge of the foliage. Lower levels are acceptable only if it is impossible to find a desired spot higher in the tree. Before placing a trap at lower levels in a tree, safety to children and the security of the trap must be considered. It should not be placed in dense foliage that may block the trap entrance or give the fly a resting place that would prevent it from entering the trap.

Maintain a foliage-free space of 12 to 18 inches around the trap, but be sure foliage and ripening fruit surround the trap beyond that distance, particularly to the bottom and sides. Traps should never be hung below the foliage canopy, nor should they be closer than four feet to the ground.

TRAP INSPECTION AND SERVICING: McPhail Trap - Remove the trap from the tree. Gently swish the contents to catch flies that are alive and clinging to the inside of the glass in the air space above the water solution. Do this over the straining pan to catch spillage. Remove the stopper while swishing and pour the contents of the trap through the straining pan. Inspection for target flies is then done as outlined below.

The bottom of the straining pan has been perforated with numerous holes (use a #50 drill bit and a white plastic pan). After the liquid has passed through, float the flies by submerging the bottom of the perforated pan in a slightly larger pan of water. Softened and rolled wings, even if detached from fly bodies, will straighten out and readily be seen on the surface of the water. Avoid spilling bait since flies might be attracted to such material instead of entering traps. Keep the trapping rig clean. Contamination of the trap may occur while on a dirty rig. Clean contaminated traps before use. Carry away old bait and wash water in a suitable container (five gallon buckets) for proper disposal. Refill the trap, add new pellets and redeploy. Keep the inside and

outside of the traps clean. The transparency of the McPhail trap and the upper portion of the Multilure® trap is important in luring flies into the trap.

CARE AND MAINTENANCE OF TRAPPING EQUIPMENT: McPhail Trap - The McPhail traps should be soaked in a solution of trisodium phosphate "TSP" for five to six hours and brushed clean. "Lime Away" can be used to clean any remaining calcium deposits. Use chemical-resistant gloves and eye protection when using these products. (NOTE: muriatic acid can be used for hard-to-clean traps but proper protective equipment such as a respirator, eye protection, and chemical-resistant gloves should be worn. Muriatic acid can be purchased from swimming pool supply outlets and diluted 20 to one with water. Traps should be soaked in a plastic drum for 30 minutes. Rinse and brush immediately after removal to reduce corrosion of the metal hanger wire. Save all neoprene stoppers). A large container such as a 50-gallon drum would be ideal for soaking traps. Cleaning the traps before winter storage ensures a clean trap in the spring during busy trap deployment and will prevent the annual compounding of mineral deposits on the glass. For programs on a year-round schedule, traps should be rotated out-of-service for cleaning. The McPhail sleds should be treated once a year with a stain or water seal and stored out of the weather when not in use.

COLLECTION AND SUBMISSION OF SAMPLES: Specimens collected from McPhail traps should be placed in an alcohol vial for submission to Sacramento (see instructions for shipping on page xiv). If two or more different kinds of insects are detected in the same McPhail trap, submit them in separate vials. The specimens need to be in alcohol to prevent rotting. Only one identification slip is necessary for specimens from the same trap. After being brought to the attention of the county entomologist and/or supervisor, the specimens are to be sent to Sacramento for identification. Use a Standard Form 65-020, "Pest and Damage Record" (PDR). Mark "RUSH" on both the form and the outside of the package. Include the trap number in the "Entomology" section of the PDR Form.

BAITING INTERVAL: For detection trapping, new bait pellets and water are to be added to the trap at every servicing.

TRAP RELOCATION:

FOR FRUIT TREES - Relocations **MUST** be made when fruit at the trap site is gone. No trap should exceed six weeks at one location over a 12 month period when suitable host sites are available. When relocation sites are limited, traps can remain longer than six weeks, as long as fruit is available at the trap site. Relocations should provide for moving the trap evenly throughout its assigned area, with a minimum relocation distance of 500 feet.

For Southern California and the Southern San Francisco Bay Area, a minimum of 100 trap sites per square mile are to be identified. No less than 80 of these sites shall be used each year. The remaining 20 sites should be factored into the relocation plan for the next year. Newly identified sites may be added at any time.

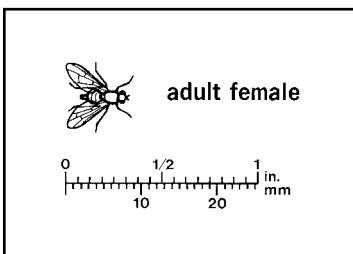
For the Other Urban Areas, a minimum of 50 trap sites per square mile are to be identified. No less than 25 of these sites shall be used each year. In the second year, utilize 60 percent of the trap sites not used, and the remaining 40 percent in the third year. Combine the new trap sites with some of the original 25 trap sites to assure use of a total of 25 annually. Newly identified sites may be included at any time.

For efficient and effective trapping, the trapper should schedule relocation in advance. If a desired fruiting host tree cannot be located, either because of lack of hosts or lateness of the season, then a trap should not be placed or maintained. This means that certain square miles may have fewer traps than the proposed level.

FOR VEGETABLE GARDENS - McPhail traps deployed at garden sites with melon fly traps will relocate on the melon fly trap relocation schedule. Prior to the deployment of and subsequent to the removal of melon fly traps, these McPhail traps will relocate on the same schedule as the McPhail traps deployed in fruit trees (six weeks).



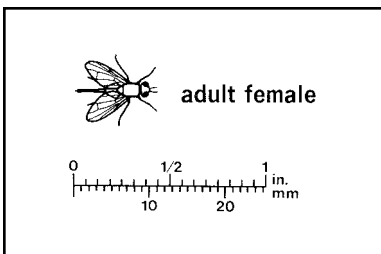
Photo courtesy of Florida DPI



CARIBBEAN FRUIT FLY
Anastrepha suspensa (Loew)



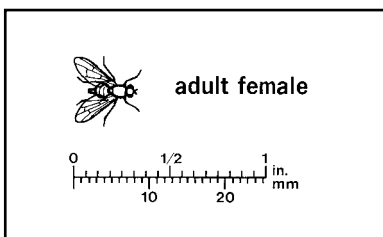
Photo by Jack Clark, University of California Agriculture and Natural Resources



MEXICAN FRUIT FLY
Anastrepha ludens (Loew)



Photo courtesy of Florida DPI



West Indian Fruit Fly
Anastrepha obliqua (Macquart)

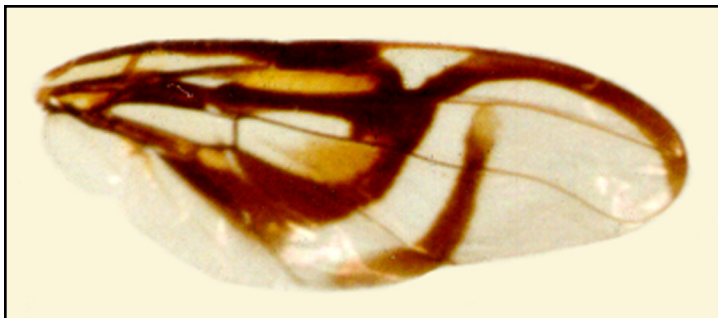
Wing Patterns of Selected *Anastrepha* Species

(Photos by A. J. Gilbert)



***Anastrepha fraterculus* (Wiedemann)**
South American fruit fly

***Anastrepha striata* Schiner**
Striped fruit fly



***Anastrepha serpentina* (Wiedemann)**
Sapote fruit fly

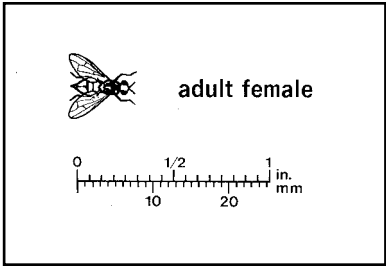
***Anastrepha obliqua* (Macquart)**
West Indian fruit fly



***Anastrepha ludens* (Loew)**
Mexican fruit fly



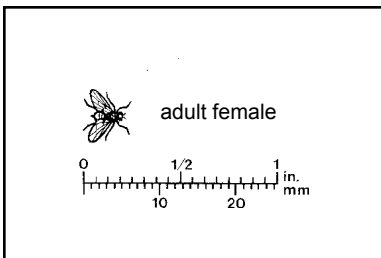
Photo by Paul Zborowski ©



Solanum Fruit Fly
Bactrocera latifrons (Hendel)



Photo courtesy of Dr. Shradanand Pernalloo, Entomology Division, Ministry of Agriculture, Food Technology & Natural Resources, Reduit, Mauritius



Tomato Fruit Fly
Neoceratitis cyanescens (Bezzi)

PROGRAM: Mediterranean Fruit Fly (Medfly) Trapping (Delimitation/Eradication Projects Only)

TYPE OF TRAP: Multilure® Trap (MT)

The Multilure® trap is a plastic trap consisting of four major components: Top (clear plastic), bottom (yellow plastic), hanger with swivel loop, and the lure pack (Fig. 1). Flies are captured in the trap when they enter the opening in the bottom and drown in a 10% solution of water and food grade propylene glycol antifreeze (PG).



FIGURE 1. MULTILURE® TRAP

ATTRACTANTS: Three-component lure is used for Mediterranean fruit fly trapping. Three-component lure consists of putrescine (PT), ammonium acetate (AA), and trimethylamine (TMA) patches. All three attractants are synthetic food lures that attract primarily female flies. Male flies may also be attracted in small numbers. Lures are shipped in sealed packages and should not be opened until the trap is deployed.

Trap Component	Stimulus	Response
Small Lure Patch	Putrescine (PT)	Feeding
Large Lure Patch	Ammonium acetate (AA)	Feeding
Large Lure Patch	Trimethylamine (TMA)	Feeding

The cylindrical shape and yellow color of the trap contribute to the trap's effectiveness by mimicking the properties of host fruit.

TRAPPING SEASON: Determined by project management.

TRAP DENSITY: Multilure® traps are used in various situations. Multilure® trap densities are determined by the species of insect trapped and the status of preventative release programs in operation. Several scenarios in which Multilure® traps are used are outlined below.

Medfly delimitation outside of an SIT area following initiation of the release of sterile flies: In areas of the state that do not have an ongoing SIT program, an alternate trapping array may be used. For example, a sterile release program may be initiated in a nine square mile area surrounding a wild Medfly find. In this nine square mile area, the trap densities will be the same as for a delimitation inside of an SIT area. The surrounding 2, 3, and 4 mile buffers will not be within the sterile release area and, for that reason, will maintain trap densities equal to a delimitation outside of an SIT program (Fig. 4).

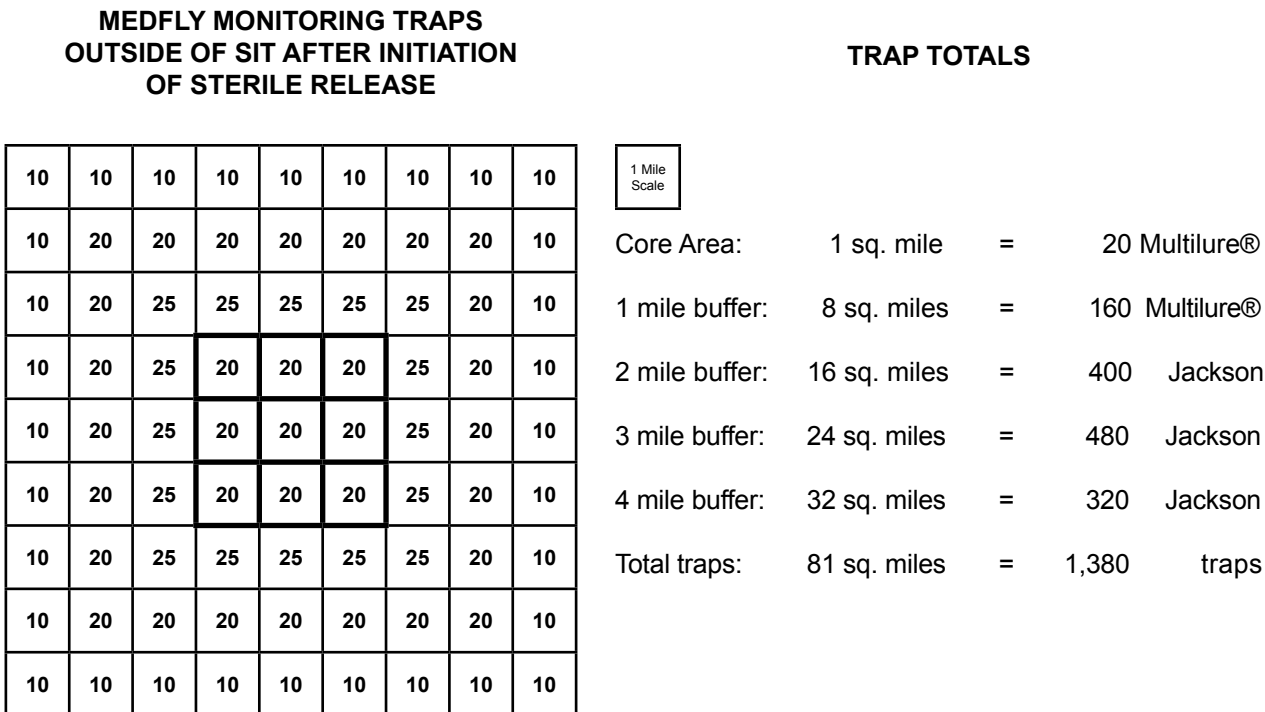


FIGURE 4.

INSPECTION FREQUENCY:

Mediterranean fruit fly - Delimitation traps in the core are serviced on a daily basis for the first week. During the first week, buffer traps are serviced daily or as often as possible. After the first week all traps are serviced weekly. The inspection frequency for the delimitation will likely change depending on the number of flies found. Refer to the Mediterranean Fruit Fly Action Plan for more detail.

HOSTS: See the host preference lists in the sections that are species specific.

SELECTION OF TRAPPING SITES: Selection of a trap site will depend on two main criteria: a suitable host tree and uniform trap distribution throughout the assigned area. At a high density of traps per square mile, every effort should be made to maintain an even distribution of traps while also utilizing the best hosts within the sphere of influence of the trap. A suitable host can be defined as one of the listed host plants with foliage and nearly mature fruit, and one that is suitable for trap placement as described under "Hanging the Trap." However, shade and shelter, particularly in hot weather, also influence host selection by fruit flies. Thus, a densely foliated host tree without fruit may be preferable to a fruiting, sparsely foliated host tree. However, a well foliated, fruiting host tree will always be the tree of first choice.

Special Considerations: At a high trap density, some areas may have a limited number of host trees with fruit. When this occurs, consideration should be given to placing the trap in a host tree with foliage and evidence of **abundant honeydew**. Honeydew is a sweetish, clear excretion produced by certain insects such as aphids, scale insects, mealybugs, and whiteflies. When present, it usually accumulates on the foliage and is a good food source for adult fruit flies. The presence of black sooty mold on the foliage indicates honeydew is present.

HANGING THE TRAP: When preparing to hang the Multilure® trap it is necessary to attach the self-adhesive lure patches to the inside surface of the top portion of the trap. Do not hang the lure patches from the plastic tabs on the top of the trap because the patches will likely fall into the solution below. First remove the back side cover from the adhesive, then remove the protective cover from the front side and use it to press the lure patch against the trap. There are three different patches identified by the abbreviated terms; PT, AA, and TMA. The AA and TMA patches are identical; therefore, it is necessary to mark the corner of each patch with its identifying letters e.g. PT, AA, or TMA. This is necessary in case one of the patches falls off and needs to be replaced.

Looking down on the trap from the top, place the putrescine (PT) first. Moving clockwise, attach the ammonium acetate (AA) and then the trimethylamine (TMA) patches on opposite sides of the inside surface of the top of the trap (Fig. 5). Immediately place the protective covers in a plastic bag for disposal at headquarters.

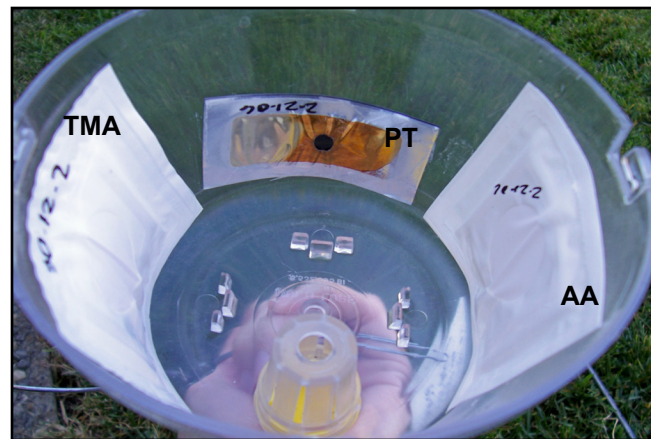


FIGURE 5.

The Multilure® trap is used wet (with a liquid solution in the yellow trap bottom). The recommended trapping solution is a dilute mixture of food grade propylene glycol (PG). Food grade PG lacks the anti-corrosive impurities of store-bought antifreeze and can be more easily disposed of since it is a food product. Alternately, marine antifreeze could also be used because it also lacks the anti-corrosives. Store-bought antifreeze, such as Prestone Lo-Tox Antifreeze® can be used if the other options are not available. If other brands are used, attention should be paid to the concentration. Some brands are already diluted to 50%. Prepare the solution in advance by adding 1 ounce of PG to 9 ounces of water in a standard 16 ounce bottle. Place this amount of solution in the trap bottom. The trap top and bottom can now be attached. Attach a hanger and date calendar to the trap and position the trap in the tree.

Place the trap in the warmest part of the tree in open shade (**not full sunlight at any time**). During extremely hot weather, traps may need to be moved to cooler areas of the tree. Traps should be placed in the upper 1/2 to 1/3 of the tree canopy on a strong branch, 1/2 to 1/3 the distance from the trunk to the outer edge of the foliage. Lower levels are acceptable only if it is impossible to find a desired spot higher in the tree. Consider safety to children and the security of the trap before placing the trap in lower levels of the tree. It should not be placed in dense foliage that may block the trap entrance or give the fly a resting place that would prevent it from entering the trap.

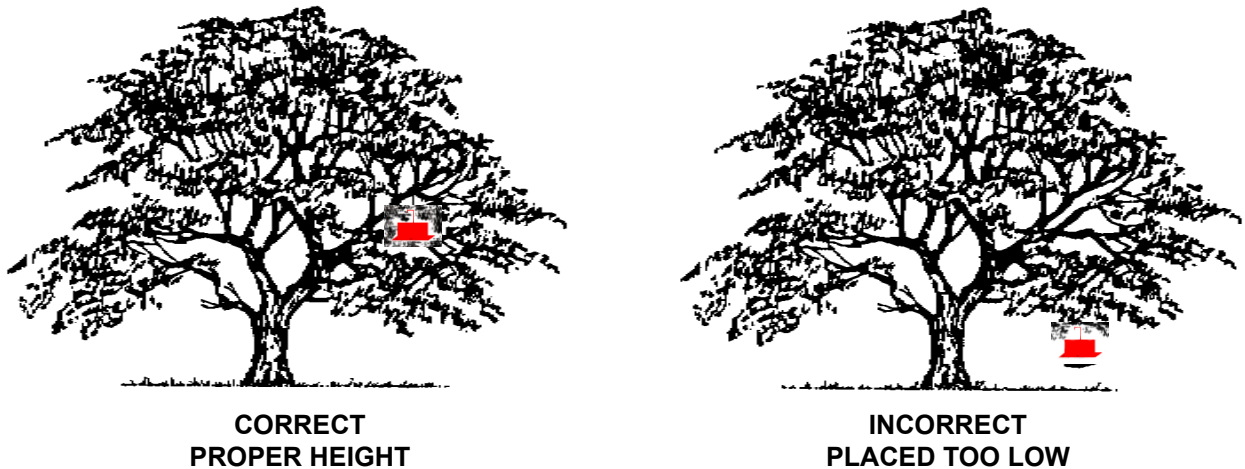


FIGURE 6.

Maintain a foliage-free space of 12 to 18 inches around the trap, but be sure foliage and ripening fruit surround the trap beyond that distance, particularly to the bottom and sides. Traps should never be hung below the foliage canopy, nor should they be closer than four feet to the ground (Fig. 6).

TRAP INSPECTION AND SERVICING: Remove the trap from the tree. Check to determine if live flies are present clinging to the inside surface of the top of the trap, behind the lure patches, or in the air space within the trap. If there are live flies in the trap, try to tap the top of the trap and knock the flies down into the solution or seal the bottom entrance with your hand and gently swirl the liquid to immobilize any specimens. Be careful not to wet the lure patches. Avoid spilling the PG solution. Remove the top of the trap and pour the solution through a straining pan such that the PG solution can be collected in a second pan for reuse. The PG solution may then be poured into a 16 ounce bottle for recharging another trap. If the PG solution is not suitable for reuse in the trap, it should be collected and disposed of in accordance with the appropriate local waste management guidelines. In many areas, food grade PG can simply be flushed down the drain (but not a storm drain).

The pan with the trapped specimens is floated in a pan of clear water. Softened and rolled wings, even if detached from fly bodies, will straighten out and readily be seen on the surface of the water. Once the fly contents of the trap have been properly reviewed, the trap is ready for re-deployment. Keep the inside and outside of the plastic trap clean. This should be done on a weekly basis with a dry rag. The trap should be washed in water at each re-baiting (every four weeks).

It is essential that the trap's calendar card is clearly marked with each date that the trap is serviced.

CARE AND MAINTENANCE OF TRAPPING EQUIPMENT: Clean traps thoroughly with plain water. A water solution with a slightly acid pH will help prevent mineral deposits on the trap. At the end of the season traps should be cleaned, dried and carefully stacked for storage.

COLLECTION AND SUBMISSION OF SAMPLES: The captured target insects from any one trap are all placed in the same alcohol vial for submission to the laboratory. Only one identification slip is required per trap. Use a Standard Form 65-020, "Pest and Damage Record" (PDR). Include the trap number in the "Entomology" section of the PDR Form.

BAITING INTERVAL: Lure patches should be replaced every four weeks. Write the date on each patch when the trap is baited.

TRAP RELOCATION: The relocation of traps is according to the following guidelines:

1. Relocate the traps as needed to hosts with ripe or near ripe fruit on an interval of 6-12 weeks.
2. Relocate the trap within its area of responsibility with a minimum relocation distance of 300 feet. Any one trap will stay within its assigned subgrid.
3. Consider using a well foliated host tree with honeydew when a fruiting host is unavailable.

PROGRAM: *Bactrocera* spp. (guava, oriental and peach fruit flies) Trapping

TYPE OF TRAP: Jackson Trap

The delta-shaped Jackson trap is made of plastic-coated cardboard (Fig. 1). Lure is placed on a cotton roll wick supported inside the trap by a wire wick holder. A sticky insert on the bottom captures flies.

The Jackson trap consists of five parts: trap body, insert, wick holder, wick, and trap hanger (Fig. 2). Trap hangers are reusable and should be saved.



FIGURE 1. JACKSON TRAP

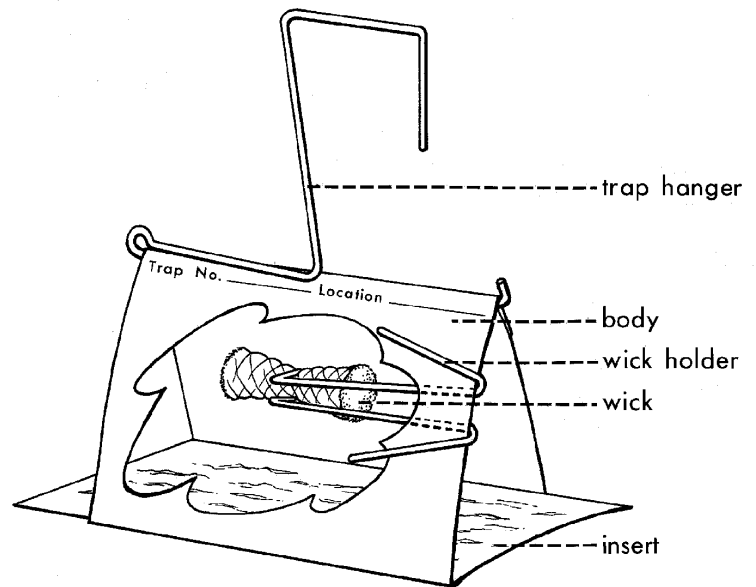


FIGURE 2. JACKSON TRAP

ATTRACTANTS: Methyl eugenol (1% dibrom is added to the lure to stun the flies). This lure acts primarily as a male attractant. When there is an absence of males, females may enter the trap. Signal Green pigment has been added as an identifying color.

Color variation in the dibrom/lure mixture is due to the reaction of the free bromine radical. Dibrom varies in color from light brown to dark brown. The color of the material does not interfere with its effectiveness. Shake well before dispensing any lure. Improper storage and handling can cause the dibrom to break down. Users should order only as much material as needed during the year. Keep the dibrom/lure mixture in closed, darkened bottles in a cool place.

METHYL EUGENOL		
Trap Component	Stimulus	Response
Wick	Methyl eugenol	Elicits strong attraction and feeding response by male oriental fruit flies.

Special instructions for the use of methyl eugenol containing dibrom:

1. A copy of the Special Local Need (SLN) registration must be carried by each trapper using the lure (page xxx).
2. The SLN instructions must be followed.
3. Pesticide labels must be carried by each trapper.
4. The following label should be attached to all service containers which contain dibrom as an addition to the lure. Complete the label by adding a local phone number where emergency calls can be directed.

<p style="text-align: center;">DANGER</p> <p style="text-align: center;">NALED + METHYL EUGENOL</p> <p>Date Pkgd.: _____ CA Dept. of Food & Agriculture 13915 Saticoy St. Panorama City, CA 91402 (818) 901-0719 IN CASE OF AN EMERGENCY, NOTIFY:</p>
--

5. The following additional label must be placed on the trap. The current phone number for the Poison Control Center is 1-800-222-1222.

Cotton wick contains 5 ml of 1% Naled (an organophosphorous insecticide), and methyl-eugenol (an insect attractant).

May be irritating to eyes and skin. If in eyes, immediately flush with water. Wash skin with soap and water. Contact a physician if irritation persists. For additional information, contact \ Para mayor información llame al:

California Poison Control System \ El Sistema de California Para El Control de Envenenamiento: 1-800-222-1222

La mecha de algodón contiene 5 ml de 1% Naled (un insecticida organofosforado), y methyl-eugenol (un atrayente de insectos).

Puede causar irritación en los ojos y la piel. En caso de contaminación lávese los ojos inmediatamente con agua. Lávese la piel con agua y jabón. Si la irritación persiste comuníquese con un médico.

OSP 08 106959

TRAPPING SEASON: Southern California - Year-round subject to host availability.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Imperial County - November through May. Subject to host availability, full deployment should be accomplished by November 1. Traps should be removed during the first servicing after May 31.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Coachella Valley - September through June. Subject to host availability, full deployment should be accomplished by September 1. Traps should be removed during the first servicing after June 30.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Southern San Francisco Bay Area - April through November. Subject to host availability, full deployment should be accomplished by April 1. Traps should be removed during the first servicing after November 30.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Other Urban Areas - May through October. Subject to host availability, full deployment should be accomplished by May 1. Traps should be removed during the first servicing after October 31.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Trapping Period												

Mountain and northern counties and rural areas are not to be trapped.

TRAP DENSITY: Detection Survey - Southern California, Southern San Francisco Bay Area and Other Urban Areas of Coachella and Imperial Valleys - Use five traps per square mile in urban and rural residential areas of 300 or more homes per square mile (except Alameda, Contra Costa, Orange, Riverside, southern San Luis Obispo, Santa Barbara, Santa Clara, and Ventura counties should use five traps per square mile in urban areas and follow the schedule listed for rural residential areas on page MF-3).

Other Urban Areas - Use two traps per square mile in urban and rural residential areas of 300 or more homes per square mile, with the following exceptions: Mendocino, Lake, Amador and Calaveras counties use one trap per square mile. In Marin, Sacramento, San Francisco, Santa Cruz, and Yuba counties use two traps per square mile in urban areas. In Fresno, Kern, Kings, Madera, Merced, Monterey, San Joaquin, northern San Luis Obispo, Stanislaus, and Tulare counties use five traps per square mile in urban areas. In rural residential areas use an equivalent number of traps per square mile as outlined below.

<u>Residences/Square Mile</u>	<u>Number of Traps</u>
25 - 250	1
251 - up (urban)	2

Traps should be placed at a residence. If no host exists at a residence, then use a host tree closest to a residence.

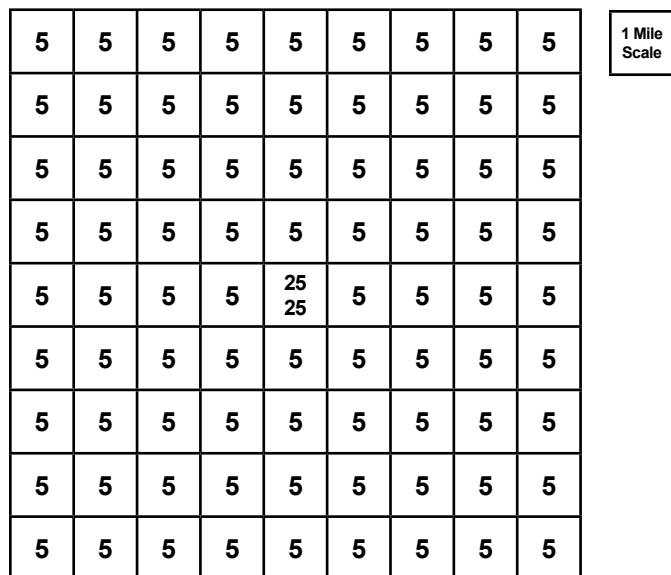
Delimitation Survey - When an oriental fruit fly is trapped, trap densities increase to 25 Jackson traps baited with methyl eugenol plus dibrom and 25 McPhail traps baited with either torula yeast or Nu-Lure in the square miles around the find. (See Table 1, MP-3). Place five Jackson traps per square mile baited with methyl eugenol plus dibrom in the remaining 80 square miles of the 9x9 mile area (81 square miles) (Fig. 3). A total of 425 Jackson traps plus 25 McPhail traps are required. Trap densities within the core square mile are increased within 24 hours.

In the situation that an incomplete or unidentifiable fruit fly specimen is found, an alternative 1 mile delimitation will be completed using the traps and numbers listed below for a "Core Area."

INSPECTION FREQUENCY: Detection Survey - once every two weeks.

Delimitation Survey - Servicing is to be conducted daily in the core square mile during the first week. Traps in the eight square miles surrounding the core are serviced every two days. All other traps should be checked at least once within the first week. The Nu-lure mixture should be reused after each servicing and replaced on a weekly basis.

**ORIENTAL FRUIT FLY DELIMITATION
TRAPS PER SQUARE MILE**



JACKSON & MCPHAIL TRAP TOTALS

Core Area: 1 sq. mile = 25 Jackson
25 McPhail

1 mile buffer: 8 sq. miles = 40 Jackson

2 mile buffer: 16 sq. miles = 80 Jackson

3 mile buffer: 24 sq. miles = 120 Jackson

4 mile buffer: 32 sq. miles = 160 Jackson

Total: 81 sq. miles = 450 traps

FIGURE 3.

HOSTS: Tropical fruits (i.e., guava, avocado, Kaffir plum, Catalina cherry, etc.), stone fruits, pome fruits, citrus, and tomato. Except for delimitation trapping, oriental fruit fly traps will be piggy-backed with Medfly traps and the host selected will depend on what is available on the property with the Medfly trap. This approach can be used because the lure, methyl eugenol, is so highly attractive.

SELECTION OF TRAPPING SITES: Selection of a trap site will depend on two main criteria: a suitable host, and uniform trap distribution throughout the assigned area. A suitable host can be defined as one of the listed host plants with ripe fruit and foliage, and one that is suitable for trap placement as described under "Hanging the Trap." However, shade and shelter, particularly in hot weather, also influence host selection by fruit flies. Thus, a tree with good foliage near (within 20 feet) a sparsely foliated host tree with fruit may be a preferable site to hang a trap. However, a well foliated, fruiting host tree will always be the tree of first choice. Do not use conifers.

Special Considerations: At a high trap density, some areas may have a limited number of host trees with fruit. When this occurs, consideration should be given to placing the trap in a host tree with foliage and evidence of **abundant honeydew**. Honeydew is a sweetish, clear excretion produced by certain insects such as aphids, scale insects, mealybugs, and whiteflies. When present, it usually accumulates on the foliage and is a good food source for adult fruit flies. The presence of black sooty mold on the foliage indicates honeydew is present.

HANGING THE TRAP: Assemble the trap by first writing the trap number and date of deployment (including the year) on both the trap body and sticky insert. The trap body is then opened; the bottom is pushed upward and firm pressure is applied laterally. **THIS IS IMPORTANT!** When pressure is released, the trap bottom will remain flat. The sticky insert is slid into place. It will bow up or down slightly and fit tightly, if properly done (Fig. 2).

Place the trap in the warmest part of the tree in open shade (**not in full sunlight at any time**). During extremely hot weather, traps may need to be moved to other areas of the tree. Traps should be placed in the upper 1/2 to 1/3 of the tree canopy, 1/2 to 2/3 the distance from the trunk to the outer edge of the foliage. Lower levels are acceptable only if it is impossible to find a desired spot higher in the tree. Before placing a trap at lower levels in a tree, safety to children and the security of the trap must be considered.

It should not be placed in dense foliage that may block the trap entrance or give the fly a resting place that would prevent it from entering the trap.

Maintain a foliage-free space of 12 to 18 inches around the trap, but be sure foliage and ripening fruit surround the trap beyond that distance, particularly to the bottom and sides. Traps should never be hung below the foliage canopy, nor should they be closer than four feet to the ground (Fig. 4).

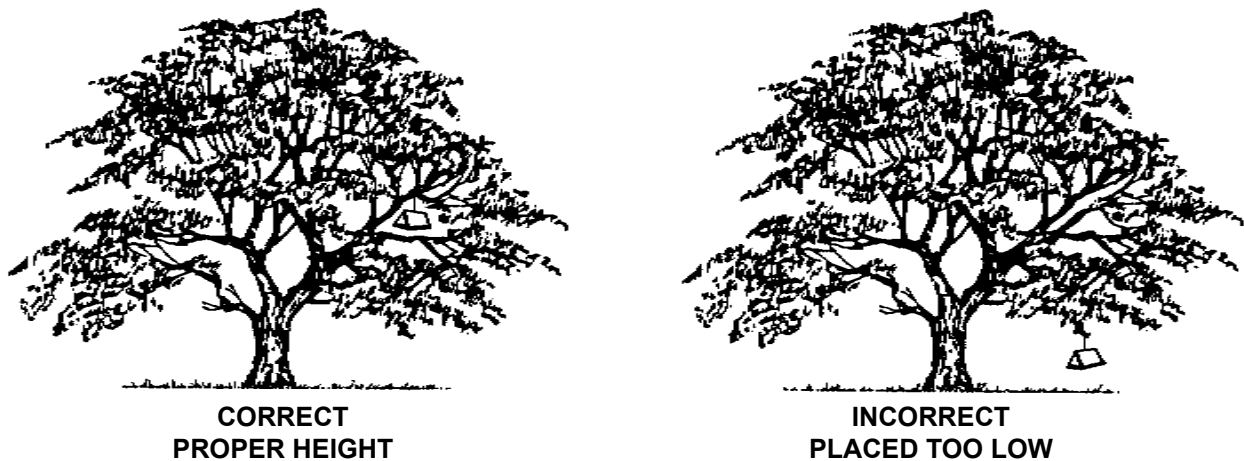


FIGURE 4.

TRAP INSPECTION AND SERVICING: When inspecting the traps, the following steps should be taken:

1. Remove the trap from the tree.
2. Pull out insert and examine entire area of stickum.
3. Remove leaves and debris from stickum as flies could be beneath these objects. Be certain that the sticky surface is not rendered less effective by dust or debris. The stickum must remain optimally sticky to capture flies.
4. If no flies are found, replace insert, date trap, bait as appropriate, and replace in tree.
5. Change inserts every month or more often as needed. Always change the insert when relocating the trap. Mark new inserts with the trap number, date, and "OF."

6. As a general rule, wicks should be changed about every four to 12 weeks. Since water (moisture) can physically force the lure out of the wicks and contaminate the trap, wicks which become wet from rain, sprinklers, etc., should be changed.
7. Do not pre-bait wicks until the day they are needed.
8. Trap bodies eventually lose their shape, become filled with trap servicing data, or otherwise deteriorate. When this occurs, they should be replaced

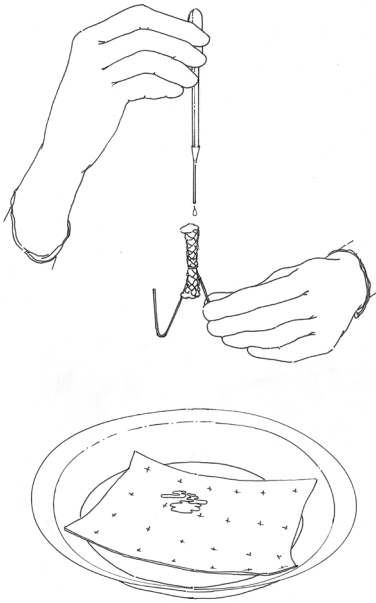
Methyl eugenol lure is to be kept in a darkened bottle. A calibrated medicine dropper is recommended for application of the lure to the wick. In accordance with the SLN, the wick is initially baited with 5 ml. of lure. One half of the lure is applied to each end of the wick. This lure contains dibrom to ensure that flies are incapacitated and held in the stickum. The following illustration shows correct positioning of the trap for baiting (Fig. 5). All baiting of wicks with lure containing dibrom should be done at a work station where appropriate safety equipment is available for use.

The following baiting procedure for oriental fruit fly (OF) and melon fly (ML) traps has been established so that the actual application is performed in the safest possible manner and to minimize the possibility of baiting one trap type with the wrong lure.

1. DO NOT BAIT IN THE FIELD.

2. Prior to baiting, determine the number of new OF and ML traps needed for the day. Assemble the required number of Jackson traps (plus an additional 10%). Open a trap body, place an unopened insert into the body to keep it open and install a wick holder and wick.
3. Prior to any lure being opened, place the appropriate 1% dibrom concentration labels on the Jackson trap bodies designated to be OF traps. Likewise, place the 5% dibrom concentration labels on the trap bodies soon to be ML traps. **KEEP THESE DIFFERENTLY LABELED, AS-YET-UNBAITED TRAP BODIES SEPARATED!** Place any other required trap labeling on the trap at this time as well.
4. When baiting OF and ML traps, never bait both trap types at the same time in the same area. Either bait one type first and then the other or have two trappers baiting in separate areas.
5. In a well-ventilated area, bait the traps over paper towels or some other disposable, absorbent material in the event of an accidental spill.
6. Always wear chemical-resistant gloves and eye protection when handling the lure/dibrom combination before it has been applied to the wick. After applying the material, rinse your gloves with soap and water before you take them off.
7. After all of the traps are baited, each trapper collects the number of baited traps required to perform all of the placements and/or rebaitings scheduled for that day in their route (plus an additional 10% to cover those traps needing unanticipated rebaiting). These correctly labeled, baited traps are placed into a large plastic bag and closed.
8. Once in the field and at the site of a trap needing baiting, remove the old trap from the tree, inspect the insert and remove the trap hanger. Place the trap hanger onto the new replacement trap, make all required notations on the new trap body and insert, and place the new trap into the host tree.

9. Place the old trap into another plastic bag at the trapping vehicle. Dispose of all old wicks as instructed by the trapping supervisor.



AVOID CONTAMINATION

Never bait over trapping supplies.

Always bait over absorbent material. It is critical to avoid contamination with this lure. CONTAMINATED FINGERS TRANSFER LURE. NO LURE CAN BE ALLOWED TO CONTAMINATE THE OUTSIDE OF THE TRAP.

FIGURE 5.

COLLECTION AND SUBMISSION OF SAMPLES: The entire trap insert containing the suspect fly should be collected for supervisory review. Specimens submitted to Sacramento should be cut from the sticky insert and placed in a dry vial for submission. Send the specimen to Sacramento with a Standard Form 65-020, "Pest and Damage Record" (PDR). Be sure the identification slip and the outside of the package are marked "RUSH." Include the trap number in the "Entomology" section of the PDR Form.

BAITING INTERVAL: Since evaporation of the lure is temperature dependent, the rebaiting schedule will depend upon the weather. Some guidelines are given below; however, trapping supervisors will have to be alert to the possibility that their particular situation may require different schedules.

Winter: eight to twelve weeks

Cool Summer or Spring Conditions: six to eight weeks

Hot Summer: four weeks

TRAP RELOCATION: Relocations **MUST** be made when fruit at the trap site is gone. No trap should exceed six weeks at one location over a 12 month period when suitable host sites are available. When relocation

sites are limited, traps can remain longer than six weeks, as long as fruit is available at the trap site. Relocations should provide for moving the trap evenly throughout its assigned area, with a minimum relocation distance of 500 feet. In areas of one trap per square mile, the trap must be relocated throughout the mile.

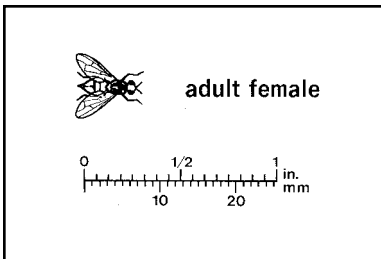
For Southern California and the Southern San Francisco Bay Area, a minimum of 100 traps sites per square mile are to be identified. No less than 80 of these sites shall be used each year. The remaining 20 sites should be factored into the relocation plan for the next year. Newly identified sites may be added at any time.

For the Other Urban Areas, a minimum of 50 trap sites per square mile are to be identified. No less than 25 of these sites shall be used each year. In the second year, utilize 60 percent of the trap sites not used, and the remaining 40 percent in the third year. Combine the new trap sites with some of the original 25 trap sites to assure use of a total of 25 annually. Newly identified sites may be included at any time.

For efficient and effective trapping, the trapper should schedule relocation in advance. If a desired fruiting host tree cannot be located, either because of lack of hosts or lateness of the season, then a trap should not be placed or maintained. This means that certain square miles may have fewer traps than the proposed level.



Photo by Jack Clark, University of California Agriculture and Natural Resources



ORIENTAL FRUIT FLY
Bactrocera dorsalis (Hendel)