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INSTRUCTIONS FOR FRUIT FLY TRAPPERS  
A MANUAL OF TECHNIQUES  
USED FOR THE 1986-87 SURVEYS IN GRENADA  
AND ST. VINCENT AND THE GRENADINES

IICA  
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OFFICE IN TRINIDAD AND TOBAGO

## What is IICA?

The Inter-American Institute for Cooperation on Agriculture (IICA) is the specialised agency for agriculture of the Inter-American system. The Institute was founded on October 7, 1942 when the Council of Directors of the Pan American Union approved the creation of the Inter-American Institute of Agricultural Sciences.

IICA was founded as an institution for agricultural research and graduate training in tropical agriculture. In response to changing needs in the hemisphere, the Institute gradually evolved into an agency for technical cooperation and institutional strengthening in the field of agriculture. These changes were officially recognised through the ratification of a new Convention on December 8, 1980. The Institute's purposes under the new Convention are to encourage, facilitate and support cooperation among the 31 Member States, so as to better promote agricultural development and rural well-being.

With its broader and more flexible mandate and a new structure to facilitate direct participation by the Member States in activities of the Inter-American Board of Agriculture and the Executive Committee, the Institute now has a geographic reach that allows it to respond to needs for technical cooperation in all of its Member States.

The contribution provided by the Member States and the ties IICA maintains with its twelve Permanent Observer Countries and numerous international organizations provide the Institute with channels to direct its human and financial resources in support of agricultural development throughout the Americas.

The 1987-1991 Medium Term Plan, the policy document that sets IICA's priorities, stresses the reactivation of the agricultural sector as the key to economic growth. In support of this policy, the Institute is placing special emphasis on the support and promotion of actions to modernize agricultural technology and strengthen the processes of regional and subregional integration.

In order to attain these goals, the Institute is concentrating its actions on the following five programmes: Agricultural Policy Analysis and Planning; Technology Generation and Transfer; Organisation and Management for Rural Development; Marketing and Agroindustry; and Animal Health and Plant Protection.

These fields of action reflect the needs and priorities established by the Member States and delimit the areas in which IICA concentrates its efforts and technical capacity. They are the focus of IICA's human and financial resource allocations and shape its relationship with other international organisations.

The Member States of IICA are: Antigua and Barbuda, Argentina, Barbados, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Dominica, the Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, St. Lucia, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago, the United States of America, Uruguay and Venezuela.

The Permanent Observer Countries of IICA are: Arab Republic of Egypt, Austria, Belgium, Federal Republic of Germany, France, Israel, Italy, Japan, Netherlands, Portugal, Republic of Korea and Spain.

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INSTRUCTIONS FOR FRUIT FLY TRAPPERS  
A MANUAL OF TECHNIQUES  
USED FOR THE 1986-87 SURVEYS IN GRENADA  
AND ST. VINCENT AND THE GRENADINES

Prepared by  
Amy J. Dreves  
United States Peace Corps Volunteer

in collaboration with the  
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and the United States Department of Agriculture

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"The views expressed in signed articles are those of the authors  
and do not necessarily reflect those of the  
Inter-American Institute for Cooperation on Agriculture."

## Foreword

For many years, plant protection and quarantine specialists in the Caribbean had reasons to believe that Grenada and St. Vincent and The Grenadines were free of fruit flies of economic importance. However, it was not until 1985 that both countries took steps to validate this contention by conducting comprehensive fruit fly surveys.

In the spring of 1986, fruit fly detection surveys began in Grenada and St. Vincent and the Grenadines with cooperation among the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (USDA-APHIS); the U.S. Agency for International Development (USAID); the Inter-American Institute for Cooperation on Agriculture (IICA) and the respective Ministries of Agriculture. Ministry of Agriculture employees of both countries were trained in fruit fly trapping techniques and survey management. The conduct of survey activities surpassed all expectations and produced results that were readily acceptable by USDA-APHIS. Accordingly, USDA-APHIS concluded that Grenada and St. Vincent and The Grenadines were indeed fruit fly free. USDA-APHIS later formally declared both countries fruit fly free and changed import requirements for most tropical fruit from both countries. Consequently, Grenada and St. Vincent and the Grenadines are the only countries in the world that can export tropical fruit to the U.S.A. without treatment. This provides important opportunities to increase exports and thus contributes to the economic well being of both countries.

Under the survey project it was soon determined that trapping techniques required in the Caribbean were considerably different from what is required in non-tropical areas of the world. As these surveys were the first of their kind in the subtropics, it was felt that the project experience should be captured in a manual. Hence, USAID and USDA-APHIS contracted the services of Ms. Amy Dreves, a U.S. Peace Corps entomologist, to develop and prepare a fruit fly trapping manual based on the information and experience gained during these surveys. Accordingly, this manual was developed by Ms. Dreves for use by Governments of the Caribbean to independently implement fruit fly surveys.

As a result of this effort, the Inter-American Institute for Cooperation on Agriculture agreed to print and distribute the manual as an initiative of the Caribbean Animal and Plant Health Information Network (CARAPHIN). Through CARAPHIN, the manual will be made available for distribution to interested persons, governments and private organizations. This has been possible thanks to support given to CARAPHIN by the Canadian International Development Agency.

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IICA Office in  
Trinidad and Tobago

September 19, 1989

## ACKNOWLEDGEMENTS

I wish to acknowledge the valuable assistance of the many references and manuals that I have read and the experienced people that I have talked to about fruit fly trapping. Most of all, I thank the people who made this programme happen! I think highly of the dedicated 'trappers' in Grenada and St. Vincent and the Grenadines who worked long hours and hot days to make this programme the best possible.

I wish to acknowledge the cooperation of the Ministries of Agriculture of Grenada and St. Vincent and the Grenadines for the use of their facilities and support throughout my work.

Part of my research was supported by a USAID grant for which I would like to thank this agency and USDA/APHIS. Special thanks is extended to Mr. Robert Strong, the APHIS Caribbean Director, for his help, advice and feedback, and to Mr. Everton Ambrose of IICA for his support in monitoring project activities.

Also appreciation is extended to individuals and friends who reviewed any part of this guide during its preparation. Their recommendations have contributed greatly to its utility.

I dedicate this manual to all these people and the many more who gave me energy to take on this challenge.

Amy J. Dreves





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# INTRODUCTION

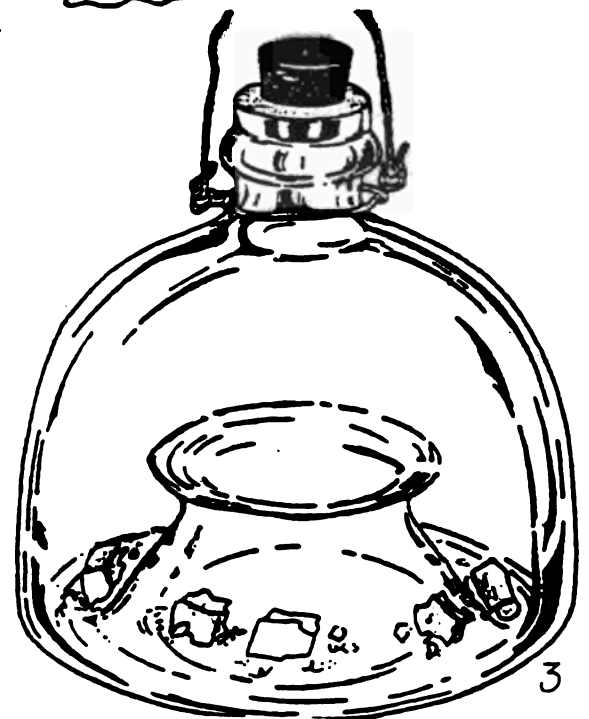
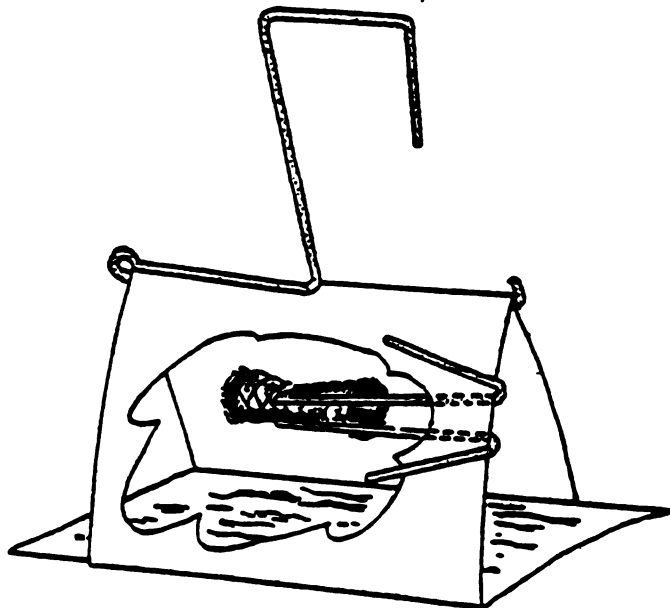
These instructions are to provide directions for trapping fruit flies of three economically important genera:

- ★ Anastrepha spp.
- ★ Ceratitis spp.
- ★ Dacus spp.

The procedures were established from a "pilot fruit fly trapping system" used in the Eastern Caribbean islands of St. Vincent and the Grenadines and Grenada in 1986 and 1987.

The procedures explain how to use two trap types - the McPhail and Jackson trap with four (4) different lures - Yeast and Borax pellets, Trimedlure, Methyl Eugenol and Cuelure to attract the various species of fruit flies.

In any insect detection and survey programme, trapping is a means by which one can detect the existence of a pest in the adult stage in a certain area. Species and populations of fruit flies are detected by means of these specially designed traps, baited with lures. Traps have to be placed using a logical strategy so that they can provide the required information for a good and complete programme.



# TRAPPER'S RESPONSIBILITIES:

## Public Relations ~

- Maintain a good public image with appropriate personal appearance and actions.
- Contact property owners before trap placement.
- Be considerate of people and their property.
- Drive courteously.

## Trapline ~

- Know the information in the Trapping Manual
- Recognize preferred host trees.
- Run trapline with an efficient route order.
- Maintain proper trap distribution.

## Procedures ~

- Maintain equipment and supplies in good condition.
- Use correct disposal of trash, discarded trap bodies and wash water.
- Know proper handling, labeling and submission of fly specimens for identification.
- Place and service traps according to manual.
- Predict needs of supplies and equipment in advance. Order and replenish as needed.
- Follow schedule precisely. Be prepared to work weekends and holidays if trapline servicing falls behind.
- Accomplish required trap rotations and relocations.

## Records ~

- Keep Accurate and complete records.
- Keep your distribution maps current with map pins and trap sequence.
- Prepare office copies of the trap cards from field copies daily.
- Complete daily summary sheet of servicings.
- Maintain trap cards with accurate map diagrammes, trap locations, descriptions and service records. 4
- Record weekly host trees trapped.
- Update daily calendar reviewing weeks planned activities.

continued...

## Vehicles ~

- Always drive safely.
- Keep vehicle clean and properly serviced.
- Report odometer reading in proper logg.

## Safety ~

- Use caution when entering property to avoid dog bites and other avoidable injuries.
- Avoid contamination of lures<sup>of</sup> chemicals on equipment, vehicle and self.

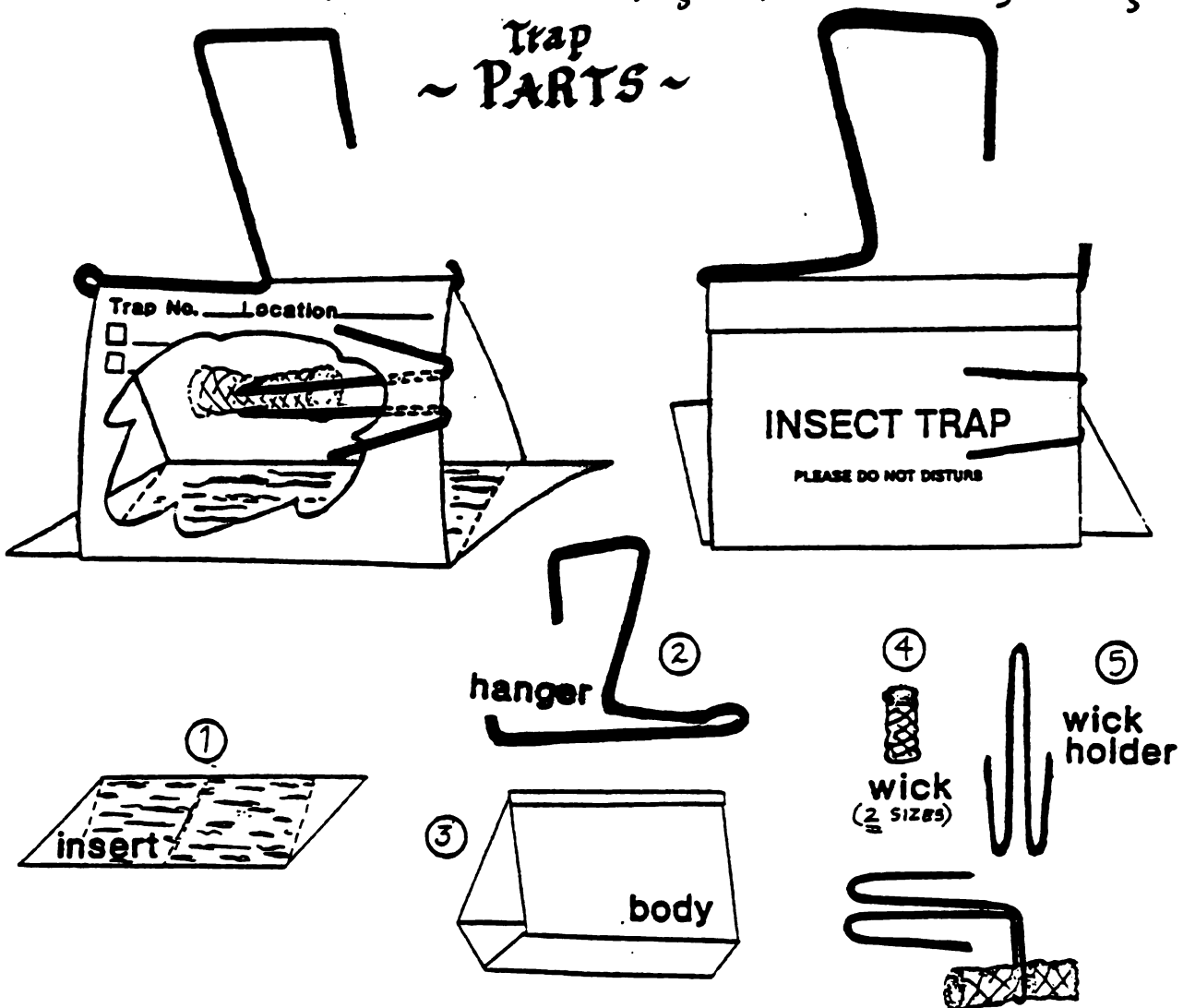
# TRAP TYPES:

## ★ Jackson Trap ~

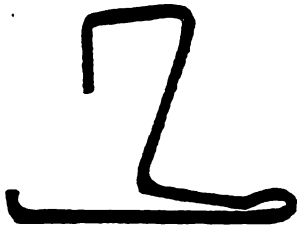
The white delta-shaped JACKSON trap is made of a polyplastic coated cardboard. Lure is placed on cotton roll wicks supported inside the trap by a wire wick holder. A sticky insert placed inside captures the flies. This type of trap is used in massive detection programmes because it is effective and cheap.

The Jackson trap consists of five (5) parts. The body of the trap is labeled with: INSECT TRAP PLEASE DO NOT DISTURB. OR CAUTION TOXIC MATERIAL: INSECT PEST SURVEY TRAP DEPT. OF AGRICULTURE.

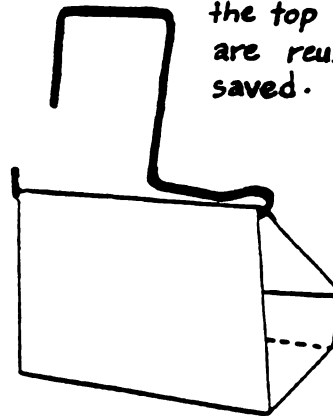
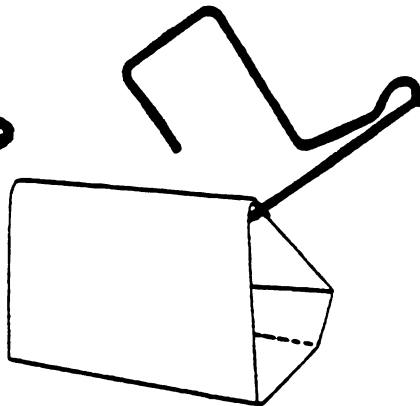
other side of trap body is used for identifying trap and marking servicing records.



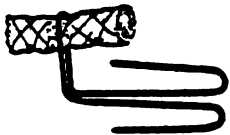
# Assembly of Jackson Trap:



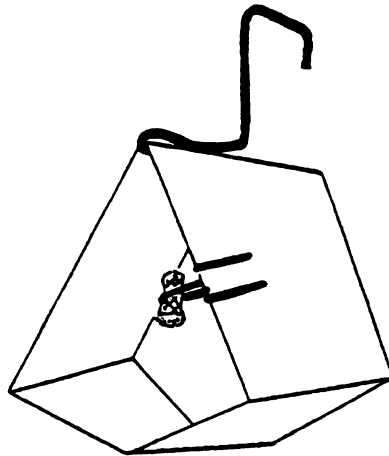
STEP 1



Insert metal trap hanger at the top of trap. Trap hangers are reusable and should be saved.

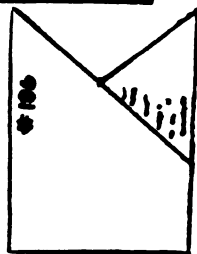


STEP 2

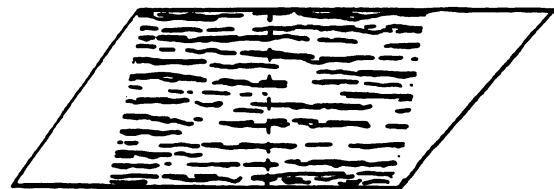
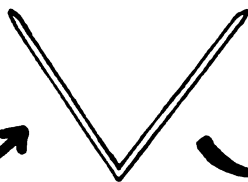


Insert the wick in the clip holder. Insert wick clip on side of trap, ensuring that once the wick is baited it does not touch side wall.

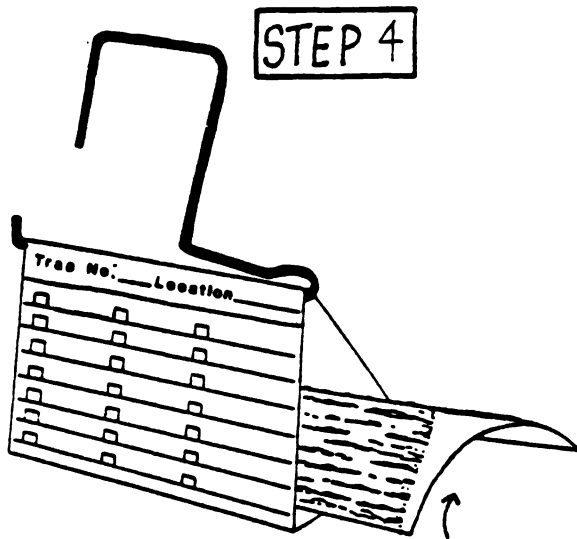
STEP 3



UNFOLD



Put trap number on non-sticky side of insert. Ensure that the stickum is applied properly to insert. Stickum should not be applied to the points extending beyond the body of the trap to facilitate inspection of the insert. The stickum card should be kept clean; stickum should be replenished when dry and card changed when dirty.



Put stickum-card into trap, sticky sides up. Insert is slightly wider than trap body, therefore it will have to be curled or bowed up lengthwise slightly before insertion.



Then the stickum card is pressed down to fit snugly in trap. Do not leave a gap or bowing of trap insert. Be sure to record information of servicing on the cardboard side. The trap should be marked with a black permanent freezer marker.



## Wicks:

If wicks "blossom" open or become dirty, discolored brittle or shrunken to the extent that their capacity to absorb has become reduced, they should be replaced. The 'used' wicks should be properly disposed of in a designated landfill or garbage pit. Forceps or Tweezers should be used when handling 'used' wicks.

The need to rebait a wick is dependent on the temperature, wind, rainfall and exposure to sun. Do not use fingers to test if a wick needs rebaiting—either smell, use sight of wick composition and use the guidelines below. If the wick appears to be supersaturated when rebaiting, then a small amount is withdrawn back in dropper to prevent dripping. Try to avoid taking in impurities of dirt and mold into lure.

TYPE OF LURE: →	Jackson Trimedlure	Jackson Methyl Eugenol <sup>o</sup>	Cuelure
<b>Wick Size</b>	1 1/2" x 3/8" diameter.	1" x 3/4" diameter	1" x 3/4" diameter
<b>Wicks Replaced</b>	3-4 month or 16 weeks or less	Replace wick when rebaiting or sooner if necessary.	Replace after 2-3 baitings or so.
<b>Wicks Rebaited</b>	Average 3 weeks (range 2-4 wks.)	Average 2-3 months	Average 1 month



∴ Jackson Trimedlure Wick

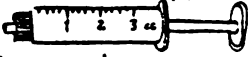


∴ Jackson Methyl Eugenol or Cuelure Wick

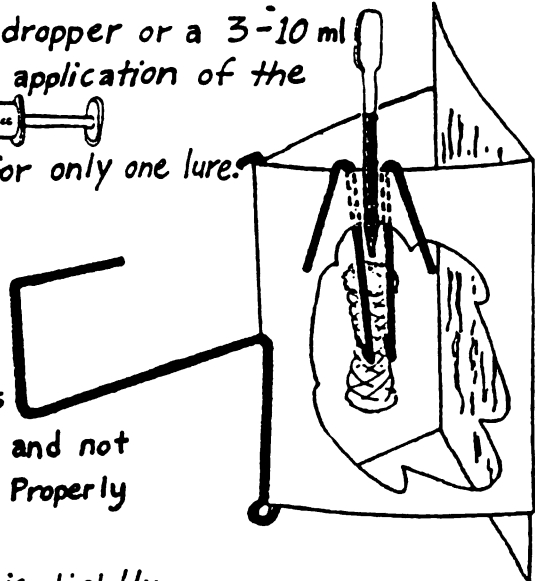
## Lure Contamination:

- ① Any drips or accidental spills will cause a decrease in effectiveness of trap. Flies may be distracted away from trap and may not enter. Spills on the ground can cause competition with the trap. Contamination may cause a fly to rest on the outside of the trap or ground rather than entering where it would be captured.
- ② Change trap parts if 'contaminated' with lure. Do not allow containers of lure and droppers to leak onto supplies bag or in vehicle.
- ③ If one gets lure on hands, it should be cleaned, not only for safety, but to prevent contamination of traps. Use soap or detergent and water.
- ④ Traps whose wicks become wet from blowing rain should be changed. Water can force the lure out of the wick and contaminate the trap.

# BAITING Jackson Trap Types:

- A trapper should carry only enough bait for one day's work. The trap is baited in the field at the trap location with supplies at hand.
- Each lure should be in a properly labeled bottle with its calibrated dropper bagged in plastic to prevent contamination.
- A 3 ml plastic calibrated bulb dropper or a 3-10 ml hospital syringe is used for application of the lure to the wick. 
- Be sure the dropper is used for only one lure.

- ① Turn trap on end in vertical position.
- ② Always put an absorbant paper towel under trap when baiting, so if lure is spilled, it will fall through to the towel and not contaminate the trapper or the ground. Properly dispose of the towel.
- ③ Check the cotton wick. Make sure it is tightly attached, and exactly in the center of the wick holder and trap body.



- ④ Add  $\frac{1}{2}$  of LURE AMOUNT to one end of wick.

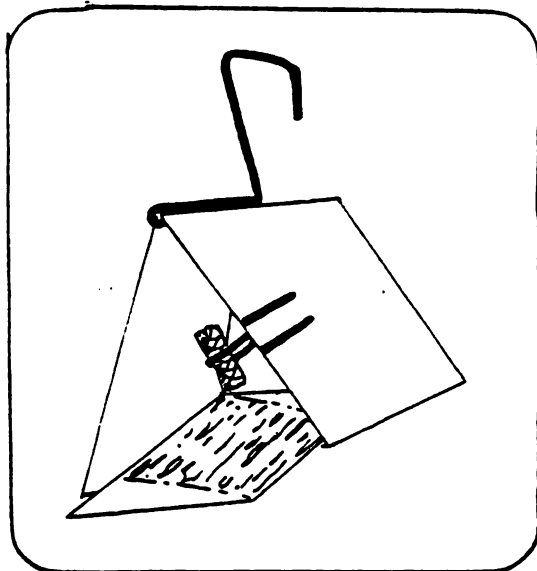
a) Jackson Trimedlure ~  $\begin{matrix} \text{TOTAL} \\ 2 \text{ ml} \end{matrix} \xrightarrow{\frac{1}{2}} 1 \text{ ml}$

b) Jackson Methyl Eugenol w/ 1% DIBROM ~  $\begin{matrix} \text{TOTAL} \\ 5-6 \text{ ml} \end{matrix} \xrightarrow{\frac{1}{2}} 2.5-3 \text{ ml}$

c) Jackson Cue lure w/ 1% DIBROM ~  $\begin{matrix} \text{TOTAL} \\ 5-6 \text{ ml} \end{matrix} \xrightarrow{\frac{1}{2}} 2.5-3 \text{ ml}$

- ⑤ Then turn opposite end of trap up, slowly add rest of measured bait to the other end of wick. This ensures proper saturation of the wick. If much more than 2 mls of Trimedlure are used, there is a danger that Medflies attracted to the trap will sit around on the surrounding foliage and not enter the trap due to the repellancy of the lure in high concentrations.
- ⑥ Do not oversaturate the wick to the point it will drip.
- ⑦ Double wick traps must not be used.
- ⑧ When rebaiting add sufficient lure, up to but not more than total amount.

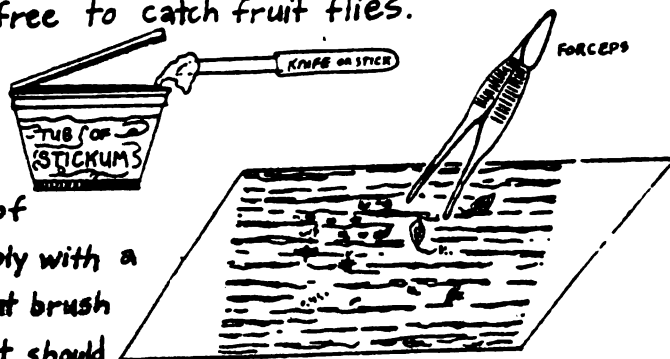
# SERVICING of JACKSON TRAPS



- INSPECT TRAP EVERY WEEK or according to your country's programme.
- To examine traps, remove Jackson trap from ripe host tree with pole carefully, avoiding contamination of the wick-lure on the ground or trap body parts.
- Check for contamination of lure on trap body and parts. Change parts if necessary.
- The trap body should be replaced when it becomes worn out. This varies depending on weather, and placement conditions (soot, rain, hit by branches). The body usually lasts about 4-5 months.
- Examine the wick to see if lure is needed. Is it time to rebait?
- Check the wicks condition. Is it clean and in good condition?
- Pull out stickum card so that entire area is visible.
- Observe card thoroughly to see if possible Tephritidae fruit flies are present.

If no 'Suspicious' flies:

- Review the card for flower blooms, debris, sticks or other objects on the stickum card. Remove with forceps to keep maximum surface of stickum free to catch fruit flies.
- Insert may need more stickum for maximum effectiveness in catching flies. Bring a small tub of stickum in field and apply with a flat stick, knife or paint brush as needed. An even coat should



Applying  
stickum:

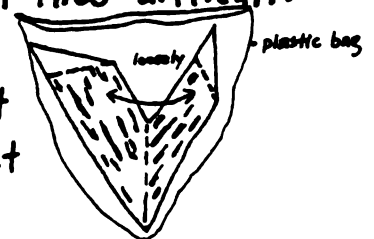
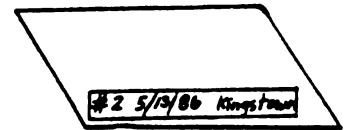
- be applied, except on ends which extend beyond the body of the trap. This area is used to pull out the insert for inspection and handling. If the insert is very dirty or full of debris, and becomes ineffective, it should be replaced. They usually last 2-3 months. Write the trap number and placement date on the reverse of the insert and spread stickum on the top if needed (as above).
- Replace insert.
- Date trap, bait if appropriate, write down necessary action codes on trap body and replace in a preferred host tree.

**NOTE:** There will be countries that are infected with citrus canker. Contamination could spread very easily by vehicles, clothing, or any tools used in trapping. In this case, it would be necessary to disinfect hands, trap supplies, trap placement pole, and any other possibly exposed material at the site. Soap should be used.

## Inspection and Submission of Jackson Inserts:

If a 'Suspicious' Tephritidae is found on stickum card:

- The insert should be brought into the laboratory and a new insert should replace the old one. All information (TRAP #) should be transferred onto the new insert and put back into trap.
- The insert with the 'Suspicious' fly should include the date collected for reference when brought into laboratory. Further information can be located on Property Survey Trap Record Card.
- The insert should be loosely folded at the crease, sticky sides together, so that it may be inserted into the plastic bags supplied. Care must be taken not to fold the sticky sides of the insert together tightly, thus making removal and identification of fruit flies difficult.
- The specimens should be submitted promptly for identification in proper place and brought to the attention of the supervisor or insect specialist.

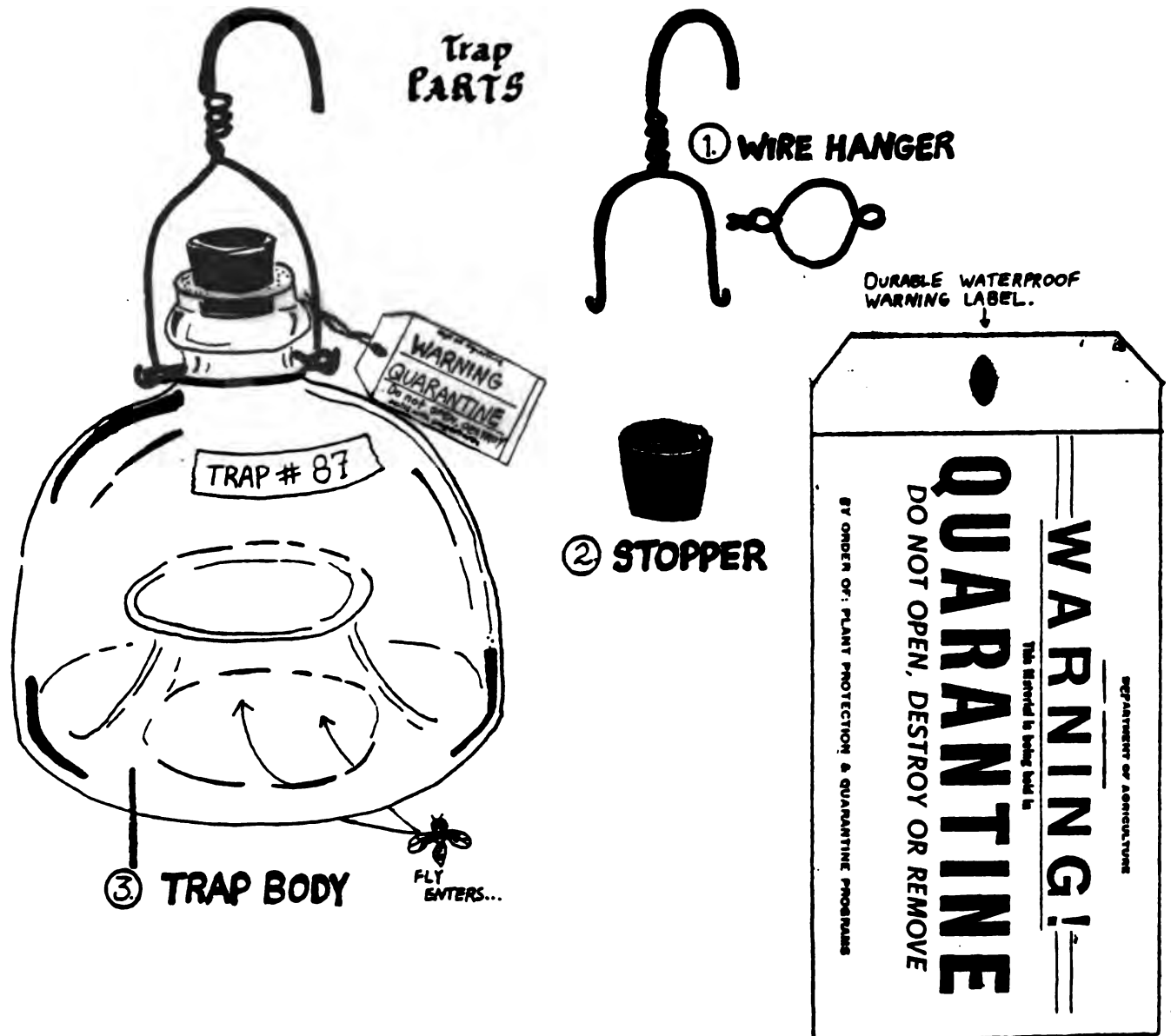


# TRAP TYPES:

## ★ McPhail Trap~

The hand-blown invaginated glass trap was developed by McPhail in 1937. This McPhail trap holds a water reservoir containing dissolved food attractant pellets which attract both male and female fruit flies. The fruit fly lives on a high protein diet which makes the yeast-borax pellet attractive. The flies upon entering the trap through the bottom, drown in the liquid lure.

The McPhail trap consists of three (3) parts. Attached to the trap wire hanger is a warning label. The trap number is written on a piece of masking tape on the trap body.



## BAITING McPhail Trap:

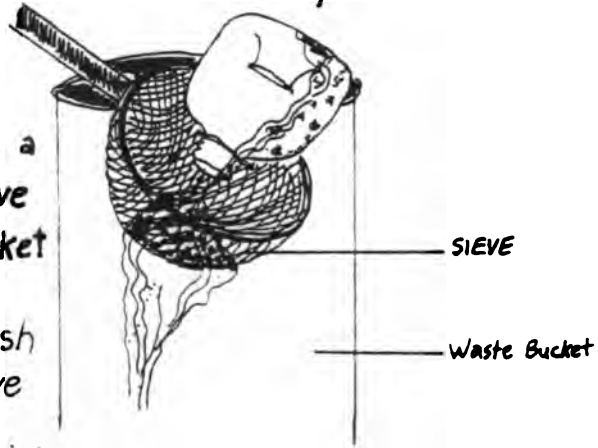
- ① Check trap for cracks, holes, leakages. Is wire hanger secure?
- ② The trap must be free from dirt, soiled areas and yeast contamination.
- ③ Dip trap upright into a bucket of clean water. Allow water to fill reservoir through bottom. Water level should be slightly below lip of opening. OR  
Invert trap and add 400 ml to 500 ml of water by cup into glass body.



- ④ Place ⑤ pellets equally spaced around in the water reservoir. Too many pellets will cause congealing or 'mud' at bottom of yeast and water. And too few pellets won't prove effective.
- ⑤ With a careful swirling motion, pellets will dissolve immediately and the attractant begins to work.
- ⑥ Any lure or bait outside the trap or on the stopper will decrease the traps effectiveness.
- ⑦ Put hard rubber stopper in top of McPhail trap.  
∴ If styrofoam or sponge stopper is used, one must put a piece of plastic over the stopper with a rubber band to prevent seepage of water from the heavy rains thus eliminating the overflow of the lure and contamination of the ground.

# SERVICING of McPhail Traps

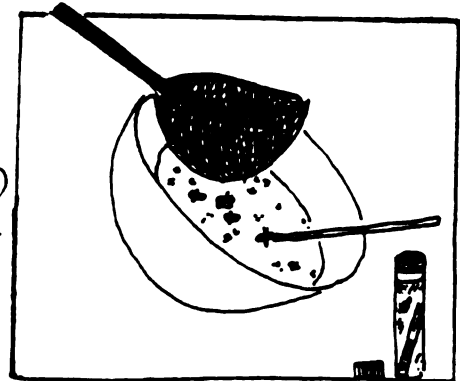
- Carefully remove trap from tree with pole. Do not contaminate lip of trap and cause spillage. This contamination on ground or elsewhere may distract flies from actually entering trap.
- Inspect trap.
- Drown live flies that have entered trap recently and are still alive.
- Stir contents by swirling trap.
- Remove stopper.
- Pour liquid-insect contents through a wide-mouthed small gridded sieve over a large plastic waste bucket with a lid.
- Add more water to glass body, to wash and release anything that might have been left behind from the first straining. Again pour contents over sieve.



Set the McPhail trap aside to be further cleaned and baited.

- Now float the insect finds by submerging the fine gridded sieve in a white wide-mouthed shallow tub or bowl of clean water to review contents. A white bowl is best for seeing the dark flies. Softened and rolled wings even if detached from fly bodies will straighten out and will be readily seen on the surface of the water.
- Spread out specimens by floating them.
- If too many insects are in the tub, some will sink and crowd each other not allowing a good view of them. Examine a small amount at a time in the white tub and discard non-Tephritids in the waste bucket as you go along until servicing is complete.
- If there are too many insects in the trap to screen in the field, place all specimens in a properly labeled vial or jar and screen back in lab.
- Collect 'suspicious' flies and use forceps or a fine paint brush to pick up flies and put in vials of 70-80% alcohol. (See pg 16)

SUBMISSIONS.



## Servicing McPhails continued...

### McPhail Trap Insect SUBMISSIONS:

✓ If 'suspicious' flies are found:

- Remove 'suspicious' flies for identification.
- Use a small paintbrush or delicate forceps to take any suspect flies out of the white tub and place in a collection vial. Fill the vial with 70-80% alcohol.
- Use a pencil or waterproof inkpen to mark the label for the vial. Include the date, trap number, location, host tree, inspectors initials. Any further information can be located on the Property Survey Trap Record Card.
- It must be brought to the attention of the Entomologist or Insect Specialist working with your programme that a 'suspicious' fly was caught.

✓ Cleaning of Traps before next use:

- Clean dirty and soiled areas from trap with a bottle brush and Kitchen scrubber. Enter through the bottom with fingers and scrubber. Remove dirt, especially on the outside of the trap. This dirty water should be poured in a waste bucket.
- Carry away wash water and waste in a suitable container. Discard in an appropriate location (ie. Bury in a pit or landfill).
- Rebait with five (5) Yeast-Borax pellets.
- Consider relocation and rotation sites. Place trap in the best selected host tree.
- Complete records.

★ ★INSPECT McPHAIL TRAPS EVERY WEEK AND REBAIT.



## Common Mistakes in Trap Maintenance :

- o The Jackson trap stickum insert does not have its proper identification number.
- o Inserts and Jackson Trap bodies not replaced often enough.
- o Failure to replace contaminated traps.
- o Contamination of ground from over-filled McPhail traps.
- o Inadequately filling out vial label information when insect specimens are submitted.
- o Failure to number the trap or to rewrite a number that has faded.
- o Not indicating on trap body when previous rebaiting occurred, if applicable.
- o Improper testing of Jackson wicks to see if it needs rebaiting — touch of the fingers is wrong.
- o Not baiting often enough.
- o Removing stopper from McPhail trap too soon before live flies drown in water inside.
- o Insects caught on the sieve are too numerous and not examined thoroughly.

## What to take in the field when 'trapping':

A separate, easy to clean, carrying case or bag for the trap parts and supplies is necessary for daily activities. The trapper should carry the supplies listed when placing and servicing McPhail and Jackson traps. The buckets of clean and waste water, chemicals, baits and glass traps should be securely contained in a box or crate to prevent spillage and breakage. A vital addition to the list is this Trappers Manual to serve as a ready reference in case questions of procedure should arise in the field.

Traps and trap parts  
Fact sheets of programme  
Paper towels  
Bottle brush & scrubber & soap  
Forceps / Paint brushes  
Small Magnifying glass  
Vials and alcohol  
Masking tape  
Freezer markers / Pencils / Erasers  
Long Pole to place traps  
One large Plastic Bucket with lid or  
gallon jugs for clean water  
One large Plastic Bucket with lid for  
waste water

One white, shallow, wide-mouthed bowl  
Droppers marked with calibrations  
Field notebook of trap cards  
Daily field trapline logg  
Trapline map  
Knife  
Plastic bags for collection  
Cut vial labels  
Wide-mouthed fine grid sieve  
Extra margarine tub of stickum  
Fly plastic mounts  
Rain hat and boots  
Clipboard is handy  
Jam jars or plastic containers  
(in case numerous flies in one trap)

# FRUIT TREE SELECTION



In selecting possible trap location sites, first consideration should be given to the availability of preferred PRIMARY host trees within the area.

Priority should be given to the hosts listed in the Preferred Host tree chart (pg. ), although fruit tree preference may change from country to country, season to season. Many different fruit trees should be trapped to test the possibilities of being a host of the Tephritid fly.

Then preference should be given to the site that has other hosts as well as the primary host tree. The primary host tree should have:

- ① Mature Ripe Fruit,\*
- ② Full Flower Blooms, OR
- ③ Abundant Honeydew

\* But when there is a choice of equal hosts, the one bearing mature ripe fruit is rated the highest. Fruit trees with honeydew (a clear excretion produced by aphids, scales, mealybugs) are a good food source for adults. Black sooty mold fungus (or 'blight') on the leaves and fruit is a good indication that honeydew is present. The fungus lives on honeydew.

The natural attractants of the host tree — ripe fruit, flower blooms and honeydew in combination with the trap lure will give the greatest chance of capturing the fruit fly.

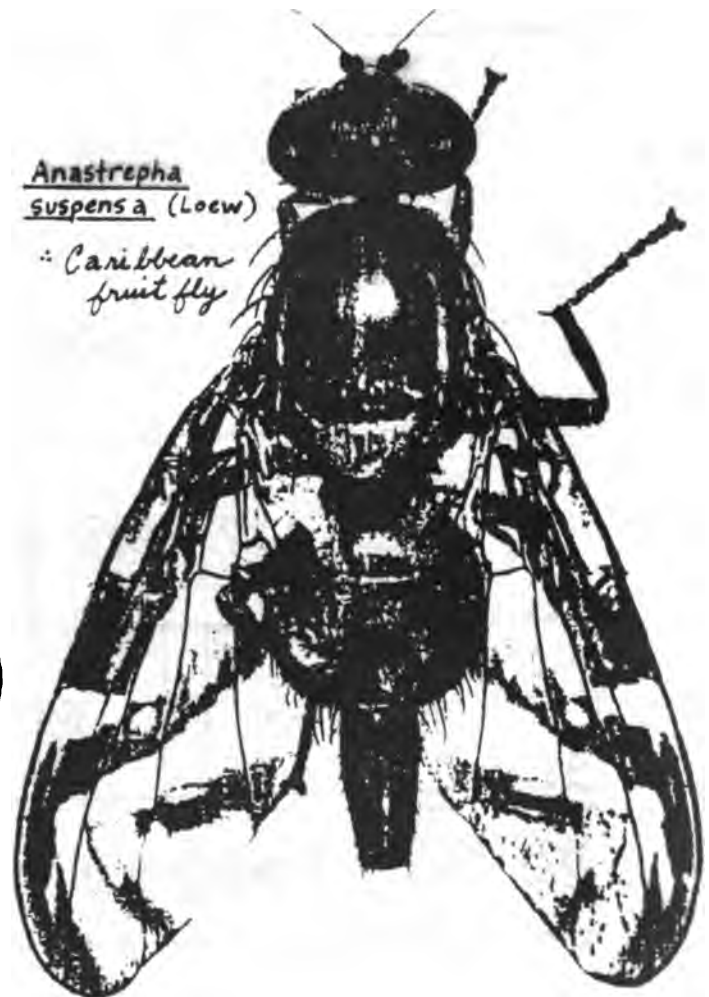
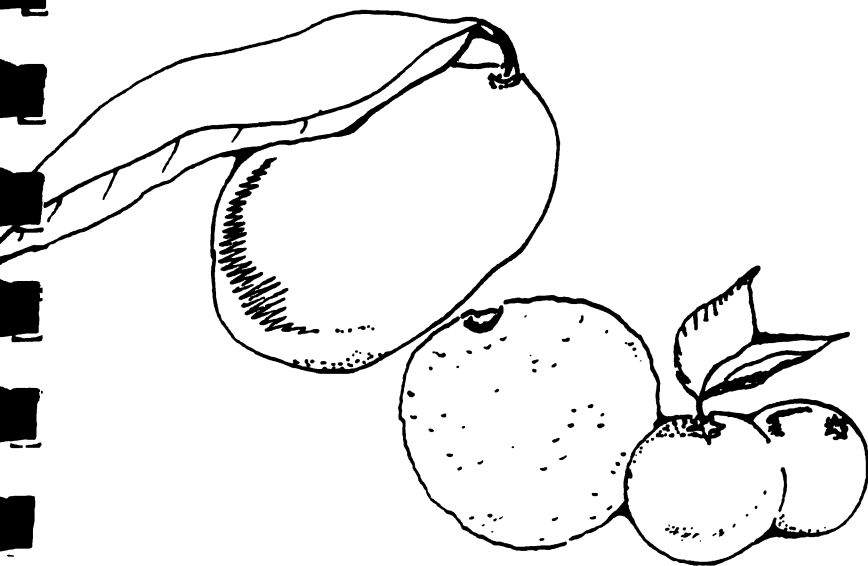


If no primary host trees are available, a secondary host should be used. In some cases a very desirable host may be too small or too large or have insufficient shade for trap placement; in such cases, a nearby 'non-host' tree may be used if proper shade and trap position can be attained. Placing a trap in a poor or second-rated host means the lure will have to draw a fly away from a natural attractant. 18

# Primary Hosts

The "Potential Fruit Flies in the Caribbean and their preferred Hosts" chart will help a 'trapper' in selecting the best available host. It is immediately evident that many preferred fruit trees chosen, may be evident as a host in some areas but not in others. So remember, this list is not a hard and fast rule. Many of the species of fruit flies are known to attack other cultivated fruits and vegetables if their preferred host is not available. See page

To get a good picture of the seasonal maturation of fruit trees throughout the year in a country, a collection of this information should be made to the trapper. This will serve as a guideline for fruit tree selections, seasonal trap density variations, fruit collections, etc. "The Average Maturation Period for Host Fruit Trees in St. Vincent" is listed on page 22-23.



# Potential Fruit Flies in the Caribbean and their preferred hosts.

TENTATIVE Fruit Flies	Host Trees		Cuculure		Methyl Euganol		Anastrepha ludens		Anastrepha fraterculus		Anastrepha suspensa		Anastrepha obliqua		Ceratitis rosa		Ceratitis capitata	
	<i>Meloni fruit fly (Caribbean)</i>	<i>Queenland fruit fly (Cuculure)</i>	<i>Quaintal fruit fly (Caribbean)</i>	<i>Mexican fruit fly</i>	<i>South American fruit fly</i>	<i>Caribbean fruit fly</i>	<i>West Indian fruit fly</i>	<i>Malta fruit fly</i>	<i>Mediterranean fruit fly</i>									
GUAVA	(S)	(P)	(P)	(S)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)
MANGO	(S)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)
SWEET ORANGE	(S)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)
GRAPEFRUIT		(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)
SOUR ORANGE		(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)
HOGPLUM/Mombin																		
CUSTARD APPLE			(P)	(S)	(P)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)
SAPODILLA		(S)	(P)	(S)	(P)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)
PAPAYA		(S)	(P)	(S)	(P)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)
ALMOND			(P)	(S)	(P)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)
CHERRY <small>(West Indian Strigosa Wild)</small>		(S)	(P)	(S)	(P)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)
COFFEE			(P)	(S)	(P)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)
CARAMBOLA			(P)	(S)	(P)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)
AVOCADO/PEAK	(S)		(P)	(S)	(P)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)
POMEGRANATE			(P)	(S)	(P)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)
CASHEW		(S)	(P)	(S)	(P)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)
TANGERINE/MAUDSLAV DRANGE	(S)	(S)	(P)	(S)	(P)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)
SOURSOP	(S)		(P)	(S)	(P)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)
MAMMEY-APPLE			(P)	(S)	(P)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)
PLUM-Tree <small>(Gambian / Red Gambian / Sen)</small>			(P)	(S)	(P)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)
PASSION FRUIT	(S)		(P)	(S)	(P)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)	(S)

(P) Primary Host  
(S) Secondary Host

Jackson  
Cuelure /  
Methy /  
Eugenol

McPhail

Jackson  
Trimedlure

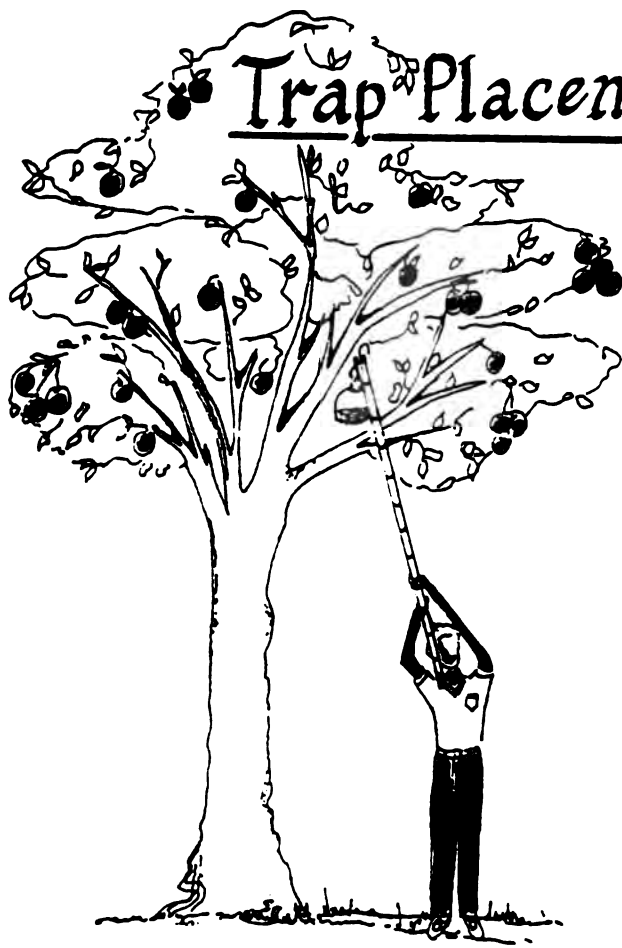
Fruit Flies Host Trees	McPhail							Jackson	
	Dacus curcubita	Dacus tryoni	Dacus dorsalis	Anastrepha ludens	Anastrepha fraterculus	Anastrepha suspensa	Anastrepha obliqua	Ceratitus rosa	Ceratitus capitata
SUGAR APPLE			(P)						(3)
LEMON	.	(S)	(S)	(S)					(P)
LIME			(S)						(P)
BANANA		(S)	(P)						(S)
SHADDOCK			(S)	(S)					(S)
ROSE APPLE			(P)	(P)	(P)	(P)		(P)	(P)
SAPOTE			(P)	(P)			(S)		(S)
LOQUAT		(S)	(P)	(S)	(P)	(S)	(S)	(P)	(P)
AKEE									(S)
BREADFRUIT			(P)						
PLUMROSE / <small>Fraxinoides</small>			(P)	(S)	(S)	(S)	(S)	(S)	(P)
GOLDEN APPLE			(P)						
FIG	(S)	(S)	(P)	(S)		(S)		(P)	(P)
BARBADINE									
STARAPPLE / <small>Caribbea</small>			(P)						(P)
GUAVASTEEN			(S)	(P)					(P)
CACTUS FRUIT			(P)	(P)					(S)

(P) = Primary Host  
(S) = Secondary Host

# Average Maturation Period for some Host FRUIT TREES in St. Vincent.

Host Trees	Scientific Names :	Annual Maturation periods:
GUAVA	<u>Psidium guajava</u> L.	Sept. → Dec.
MANGO	<u>Mangifera indica</u>	May → Aug.
SWEET ORANGE	<u>Citrus sinensis</u>	Aug. → Jan.
GRAPEFRUIT	<u>Citrus paradisi</u>	Oct. → Feb.
SOUR ORANGE	<u>Citrus aurantium</u>	Oct. → JAN.
WILD ORANGE	<u>Swartzia simples</u>	
HOGPLUM/MOMBIN/JOBO	<u>Spondias mombin</u> L.	Sept. → Nov.
CUSTARD APPLE/ BULLOCKS HEART	<u>Annona reticulata</u>	Nov. → Feb.
SAPODILLA	<u>Manilkara zapota</u>	Apr. → June
PAPAYA	<u>Carica papaya</u> L.	YEAR AROUND
ALMOND	<u>Terminalia catappa</u>	Sept. → Dec.
CHERRY:		
WILD CHERRY	<u>Marlieriopsis eggersii</u>	AUG. → OCT. ; MAY-JUNE
WEST INDIAN CHERRY (Barbados)	<u>Malpighia punicifolia</u> L.	
SURINAM CHERRY (French)	<u>Eugenia uniflora</u> L.	
COFFEE	<u>Coffea</u> spp.	JAN. → Feb.
CARAMBOLA (Five Fingers)	<u>Averrhoa carambola</u>	Oct. → Dec.
AVOCADO (Pear)	<u>Persea americana</u>	Aug. → Oct.
POMEGRANATE	<u>Punica granatum</u>	July → Aug.
CASHEW	<u>Anacardium occidentale</u>	June
TANGERINE/ MANDARIN ORANGE	<u>Citrus reticulata</u>	Oct. → Dec.
SOURSOP	<u>Annona muricata</u> L.	Oct. → Feb
MAMMEY APPLE	<u>Mammea americana</u>	Dec. → Jan.
PLUM:		
JAMAICAN PLUM	<u>Spondias puberea</u>	AUG. → SEPT.
DUNKS PLUM	<u>Myrcia splendens</u>	AUG. → OCT.
JAR PLUM	<u>Chrysophyllum argenteum</u>	MAY & AUG.
RED BEQUIA PLUM	?	APR- JUNE
JAVA PLUM	<u>Syzygium cumini</u>	

Host Trees	Scientific Names:	Maturation Period:
GOLDEN APPLE	<u>Spondias cytherea</u>	Sept. → Nov.
PASSION FRUIT	<u>Passiflora edulis</u>	Oct. → Dec.
SUGAR APPLE/SWEET SOP	<u>Annona squamosa</u>	Aug. → Nov.
LIME	<u>Citrus aurantifolia</u>	Sept. → Dec. ; Mar. → July
LEMON	<u>Citrus limonia</u>	Sept. → Dec. ; Mar. → July
BANANA	<u>Musa paradisiaca</u>	Year Around
SHADDOCK/PUMMELO	<u>Citrus grandis</u>	Sept. → Nov.
BARBADINE/ GIANT GRANADILLA	<u>Passiflora quadrangularis</u>	July → Sept.
ROSEAPPLE	<u>Syzygium jambos</u>	Feb. → APR. Sept. → Oct.
PLUMROSE/POMERAC (French Cashew) (Malay apple)	<u>Syzygium malaccensis</u>	
SAPOTE	<u>Calocarpum sapota</u>	
WILD PLUMROSE	<u>Myrcia deflexa</u>	
LOQUAT	<u>Eriobotrya japonica</u>	
FIG	<u>Ficus carica</u>	
AKEE	<u>Blighia sapida</u>	Aug. → Sept.
BREADFRUIT	<u>Artocarpus altitis</u>	Year Around
STARAPPLE/ CAIMITO	<u>Chrysophyllum cainito</u>	
CACTUS FRUIT	<u>Opuntia spp.</u>	
GUAVASTEEN/PINEAPPLE GUAVA	<u>Feijoa seilowiana</u>	



## Trap Placement in Host Trees

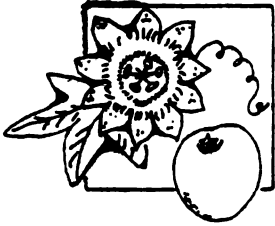
When entering a property for the first time, a trapper should always attempt to contact the property owner or caretaker to explain the work briefly and ask permission to place trap.

Every trapper (or trapping team) should have a 4 meter telescope pole, a bamboo pole with a notch in the end or an adjustable aluminum pole for placing a trap in the best position possible and in tall trees.



# Do's and Don't's of Trap Placement

## Do's:



**Do** place trap in a primary host tree with mature ripe fruit, flower blooms or abundant honeydew when possible.

**Do** place trap in the best fruit tree that also takes advantage of the prevailing wind downwind to carry the lure scent over the maximum area of fruit trees to draw flies in.

**Do** place trap approximately in the middle of the tree canopy - about 5-8 feet above ground level.

**Do** place trap  $\frac{1}{2}$  to  $\frac{2}{3}$  of the distance from the trunk and the outer edge of the foliage.

**Do** maintain a foliage-free space of 6-12 inches around trap.

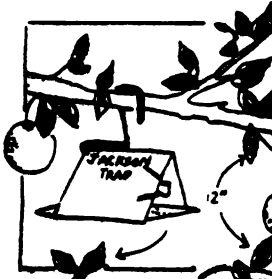
**Do** try to have some foliage and ripening fruit surrounding trap.

**Do** place the trap high enough to be out of reach of children, goats, cows and people passing by.

**Do** secure trap to prevent it from falling down.

**Do** place trap in brightest part of open shade within tree.

**Do** place trap in a location so it will not be in direct sunlight any time during the day.



## Don't's:

**Do Not** place trap at a given height at the expense of dense shade or open sun.

**Do Not** put trap in direct sunlight or too low to the ground.

**Do Not** hang trap below or outside foliage of host tree.

**Do Not** hang trap on a tree with thin foliage.

**Do Not** hang trap in a poor host when a desirable host is nearby.

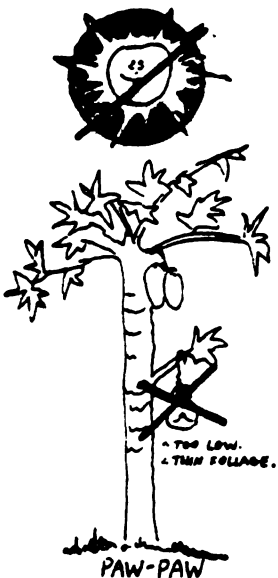
**Do Not** allow foliage to protrude into trap or obstruct trap entry.

**Do Not** put two lures in same trap.

**Do Not** contaminate trap, supplies, ground or yourself with lure.

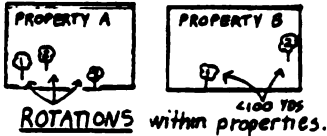
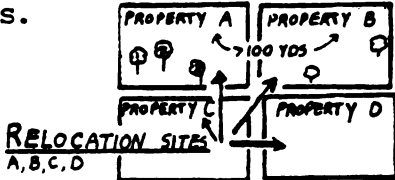
**Do Not** hang traps on fence posts, telephone poles, clotheslines, etc.

**Do Not** place a second trap less than 3 ft. of another trap.



# Trap Rotation / Relocation

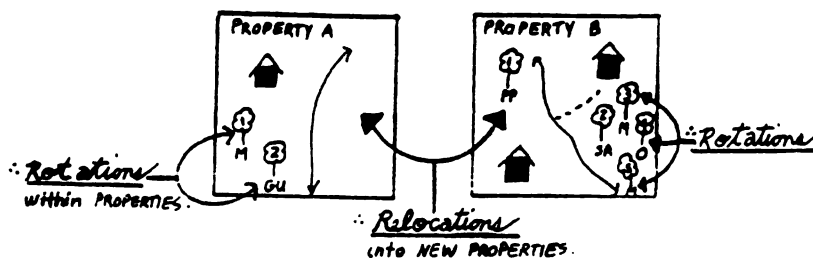
It is impossible to place traps at every point where a fly might exist, so traps must be moved from one fruit tree to another on a regular basis. A trap is "ROTATED" to another fruit tree on the same property diagram, less than 100 yards from the previous host. During "RELOCATION", a trap is moved more than 100 yards, to a new property of host trees.

Guidelines for Rotations :	Guidelines for Relocations :
<p>All Trap Types. Less than 100 YDS. from one host to another desirable host, the trap is rotated <u>within a property diagram</u>. Rotate every <u>1 - 2 weeks</u> into new host trees.</p> 	<p>All Trap Types. Greater than 100 YDS., the trap is relocated into a <u>new property</u> of host trees. New rotations take place on this property. Relocate every <u>6 - 12 weeks</u> into new property diagrams of host trees.</p> 

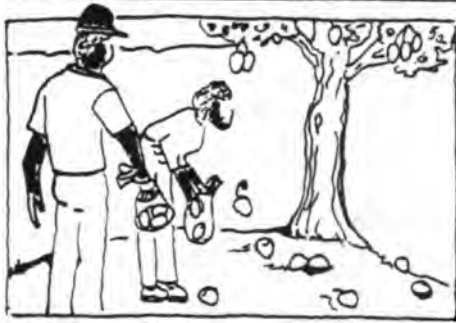
Traps are effective over limited areas only, so rotations and relocations are an essential part of an effective trapping programme. All areas should be covered as extensively as possible.

Once a trap is set on a property within an area, Rotation and Relocation sites are considered. It is good to familiarize oneself to a chosen trapline area before placing traps. This way one can best plan the relocation and rotation sites in advance to avoid crossing into another trap's territory.

When considering a suitable fruit tree for trap rotations and relocations, keep in mind the accessibility, safety, and placement possibilities. A trap card allows for four (4) properties, or relocation sites to be identified. Traps are relocated on new properties for varied lengths of time depending on host availability, the type of programme, seasonal fruit production, etc.



# FRUIT COLLECTIONS, CUTTINGS, REARINGS.

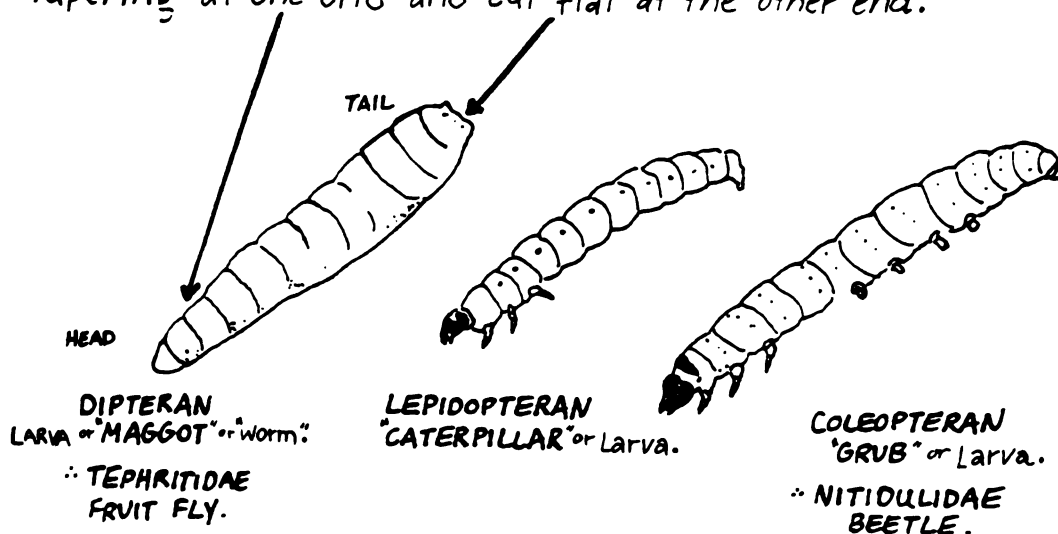


When collecting fruit in the field for examination within the lab, fruit sample collections should include all stages of ripeness including the most attractive good mature fruit, fruit 'breaking'

color, older fruit, blemished injured fruit, etc. Sometimes one may recognise the 'halo' around the sting or oviposition sites. This area may begin to discolor. Visually examine the collection of fruits in the area and save and label any questionable samples. Inspect suspect fruits in the lab to prevent loss of larvae.

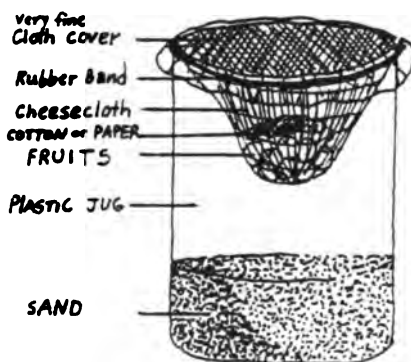
Under your trapping programme organize certain days from different areas in your country to collect fruit samples for rearing purposes of possible fruit fly maggots or 'worms'. Collect fruit in plastic bags and include a label stating the date, location, fruit and collector. Note trap number if collected from a tree containing a trap. Each sample collection is logged in a record book.

After cutting fruit open, expose it to sunlight - watch for movement. When air temperature is warm, larvae tend to be active - jump, flex, spring. One must look closely for the larvae under the skin, in the pulp or near the seed. You may differentiate Tephritidae fly larvae from other types of larvae by the absence of a 'hard' (sclerotized) head capsule, legs, and the presence of mouth hooks. The larvae of fruit flies are usually cylindrical, gradually tapering at one end and cut flat at the other end.

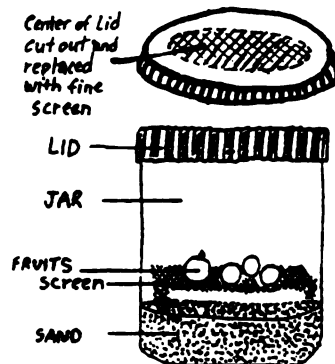


# Rearing of Larvae:

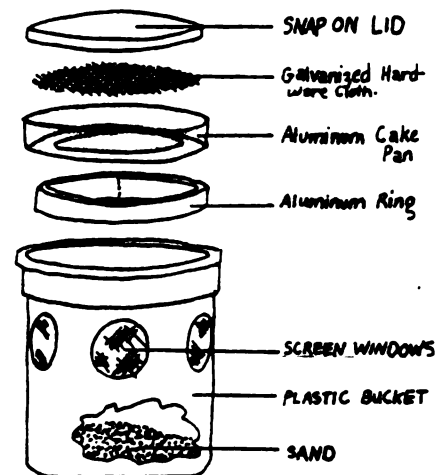
Rearing of possible damaging Tephritidae larvae is done to determine what species of fly are feeding on a particular host. The larvae, which can't be easily identified in most instances, are reared to adults, which can be identified. Select a few questionable fruit from your collection for rearing. Place the fruit in rearing containers. The disturbance and interference with the larva's cycle when cutting through the fruit and exposing it to the air can cause the larvae to die, mutate or slow the development. So do not cut fruit you plan to hold for rearing.



Ex 1) Locally made.



Ex 2) Locally made.



Ex 3) Manufactured and requested by:

Mr. DON HENRY 2/20/89  
 Dept. FOOD AND AGRICULTURE  
 PEST DETECTION EMERGENCY PROGRAMS  
 1220 N. Street, Rm. A350  
 Sacramento, CA 95814

## REARING CONTAINERS

Rearing containers can be locally made. All sizes of wide-mouthed jars, clear plastic containers or plastic soda bottles with the lids cut off can be used. A layer of clean sand (preferably fine grain), sawdust or vermiculite should cover the bottom. This serves as a pupation site for the larvae after they leave the fruit. The sand should be sifted to make it clean. You can bake it in the oven or place it in the hot sun to kill any living things.

## Rearing of Larvae continued.....

The jar should be properly labeled with date, collector's name, host, area and trap number (if host tree contained a trap). The fruits are then placed in fine netting or cheesecloth (See Ex. 1, pg. 28) and suspended over the slightly moist sand inside the container. The holes in the netting should be smaller than the fruits but large enough to allow larvae to crawl through. Or the fruit can be set on a metal screen or galvanized cloth above the sand (See Ex. 2 & 3, pg. 28). To prevent juice from dripping down on the sand, thus causing the sand to mold, a piece of paper towel can be placed on the bottom to absorb the juice. A fine cloth cover can be placed over the top of the containers. A rubber band will work to hold the netting in place. The center of a tight jar lid can be cut out and replaced with screen or netting. The cover prevents other insects from entering and wandering larvae from getting out.

The containers must be checked frequently. Record observations on a labeled sheet of paper attached with rearing container. Every week the sand is sifted for pupae. Any pupae detected are put in individual labeled vials with cotton stoppers. The label should include date, collector's name, host, area. After all the larvae have had time to emerge from the fruit, remove the fruit and cut it open carefully for any more pupae. After adults emerge from the pupae, leave them in the vial for a few days to gain their full color and size.

# TRAP MAPPING

In order to determine proper trapping locations and density, and to distinguish between trapline zones, a large country map should be displayed on the office wall. Designated traplines can be enlarged to provide individual map locations. Each trap placed is given an assigned number and each trap type is given an assigned colored pin. These individual trap pins are placed in the approximate area on the map and moved accordingly when a trap is relocated to new areas. In addition, the order in which the traps will be serviced on a trapline can be displayed under the individual trapline maps. Movable pins can be used to allow the sequence to change as necessary. The trapper (or trapping group) must keep their traplines updated with appropriate number of colored pins plotted accurately on the map.

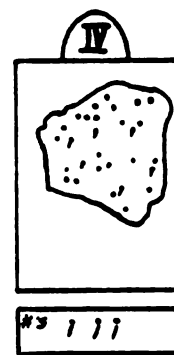
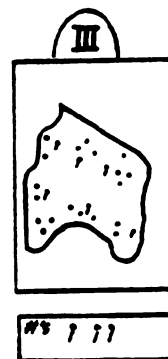
EXAMPLE:

ISLAND of  
ST. VINCENT  
(5 TRAPLINES)

LARGE  
COUNTRY  
MAP



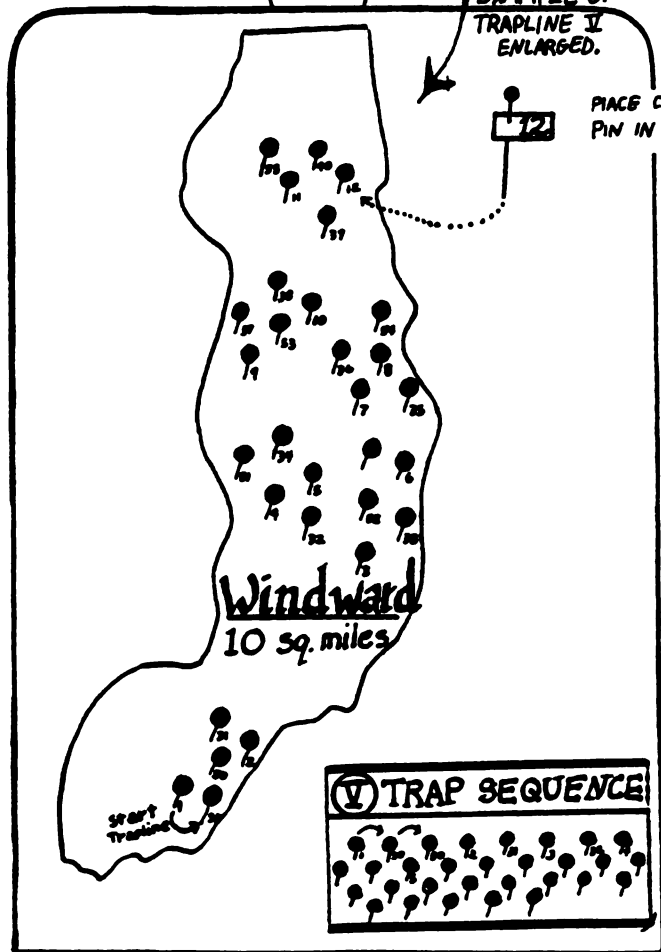
EACH  
TRAPLINE  
ENLARGED



V

EXAMPLE OF  
TRAPLINE II  
ENLARGED.

PLACE COLORED, NUMBERED  
PIN IN TRAP LOCATION.



...Colored Pins...

KEY TO TRAP TYPES:	
color,	
BLUE PIN	① MCPHAIL
RED PIN	② JACKSON TRIMED LURE
GREEN PIN	③ JACKSON METHYL EUGENOL
YELLOW PIN	④ JACKSON CUELURE

# RECORDING and REPORTING

Accurate reporting and recording are essential parts of the trapping programme. Up-to-date complete records are kept to ensure proper trap rotations, relocations, baitings, servicing, fruit collections, submissions rearing examinations, etc. All information should be filed in such a way that any important records can be easily located later. Without proper recording and reporting, the programme would not be accepted by other countries. Falsification of records and/or inaccurate figures recorded would create additional problems and could destroy the credibility of a programme.

## Record Keeping - CHARTS

- |   |   |   |  |
|---|---|---|--|
| 1 | WEEKLY TASK CALENDAR  | 6 | DAILY OFFICE TASK DIARY                |
| 2 | PROPERTY SURVEY TRAP RECORD CARD<br>or "TRAP CARD"                                | 7 | FRUIT COLLECTIONS/CUTTINGS<br>REARINGS |
| 3 | DAILY FIELD TRAPLINE LOGG   | 8 | PLACEMENT OF TRAPS- PROPERTY<br>OWNERS |
| 4 | PERCENTAGE LOSS IN TRAP BODIES AND TRAP<br>PARTS (MISSING, BROKEN, AND DISCARDED) | 9 | HOST TREES TRAPPED PER WEEK/<br>MONTH  |
| 5 | DAILY SERVICING RECORDS   |   |  |

\* The trap cards (Field copy) and Daily field trapline logg are taken into the field while trapping. Information and observations are recorded at each trap.

\* The remaining record stay in the office. Each trapper (or trapping group) fills in the information daily from the logg and field trap cards. An office trap card must be duplicated from the field trap card. Weekly and Monthly totals are calculated for some charts (#4,5,9). On other charts, all the trappers (or trapping groups) compile the information on one project copy of the chart (#1,4,7,8).

1

### WEEKLY TASK CALENDAR

To assist in following a close schedule and maintaining an efficient trapline a Weekly Task Calendar can be placed on the wall or desk outlining each day's activities during a week. This includes:

Date; Trap servicing area & total traps servicing per day; List the order in which one will service the traps ; Specify other tasks per day.

This calendar has pockets in which the above information of the day's activities of all trappers can be put into.

If for some reason this schedule cannot be maintained (i.e. Servicing of trapper's vehicle, heavy rains, holidays, etc.), arrangements should be made with the supervisor and the calendar should be updated. Any pocket can be changed accordingly. This calendar can be very useful to locate a trapper or trapping group of their whereabouts on any particular day.

**WEEKLY TASK CALENDAR**

Month:

	Date :	Area - Total Traps	Task - Trap Sequence
Mon	<input type="text"/>	<input type="text"/>	<input type="text"/>
Tues.	<input type="text"/>	<input type="text"/>	<input type="text"/>
Wed.	<input type="text"/>	<input type="text"/>	<input type="text"/>
Thurs	<input type="text"/>	<input type="text"/>	<input type="text"/>
Fri.	<input type="text"/>	<input type="text"/>	<input type="text"/>

(EMPTY Pockets to slip dates, areas and tasks into for each day.)



**2** **PROPERTY SURVEY TRAP RECORD CARD or "TRAP CARD"**

The trap card must be precise in case a substitute trap inspector has to find the traps along a trapline. The directions and map must be prepared in a manner that will permit another person to locate each trap. This record is prepared at the time the trap is set in the field. The trap card provides for recording detailed information of the identity of each trap type and number, and the exact location of the trap. It also includes a history of the servicing of the trap. There are two copies of the trap card. One is taken out to the field when servicing traps. The other copy is kept in the office. Each day after trapping, transfer the information from the field copy onto the office copy.

INSTRUCTIONS FOR PROPERTY SURVEY CARDS [These details should be given close attention.]

- \* Each trapline will have its own hard back notebook (binder).
- \* Record trap information immediately on field copy of trap card after servicing. Do not wait until a later time. Office copy of trap card should match Field copy.
- \* Maintain all information within the appropriate columns.
- \* Remarks should be noted on the back of the trap card in the space provided, and according to the property of the trap(A,B,C,D).
- \* The trap card is designed to show four possible trap sites within each trapping area.
- \* The cards should be filed in the order in which they will be serviced.
- \* Always use pencil for trap card entries so corrections can easily be made.
- \* Cards should be of thick poster board material. The use of clear plastic covers for the trap cards can protect them from wear and tear of handling in the field.
- \* Sketch recognizable streets, landmarks, structures, and distances on properties chosen for trapping. Use ruler for neatness. Diagram must be in scale.
- \* Draw property diagram maps with North towards the top edge (N↑).
- \* Name the host tree with a code and mark its approximate location on the property. Write a complete address of trap location.
- \* If available, use two different colored trap cards- one color for McPhail traps and the other for Jackson traps.

Continued.....

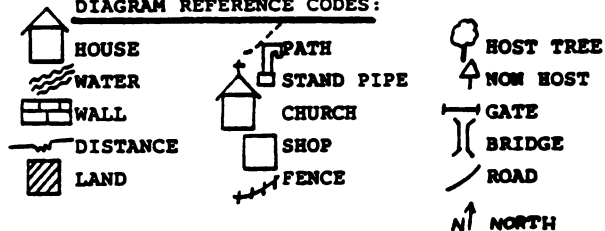
- \* Include a detailed written description of the location of each trap on the property.
- \* Non-host trap sites should be noted on the trap card to facilitate locating the trap.
- \* Remember you may not always be the person who needs to locate a property and find the trap, so be sure maps are accurate.

\* Follow CODES outlined.

ACTION CODES:

- R = ROTATION
- RL = RELOCATION
- M = MISSING TRAP
- BK = BROKEN MCPHAIL
- D = DISCARDED TRAP BODY
- SK = SKIPPED
- ✓ = SERVICED
- NW = NEW WICK
- NI = NEW INSERT
- X = CLOSED
- P = PLACED
- 3 = BAITED
- C = CONTAMINATED

DIAGRAM REFERENCE CODES:



HOST TREE CODES:

- |                       |                            |
|-----------------------|----------------------------|
| AKEE..... AK          | LEMON..... Le              |
| ALMOND..... AL        | LIME..... Li               |
| BANANA..... Ba        | MAMMEY APPLE..... MA       |
| BARBADINE..... B      | MANGO..... M               |
| BEQUIA PLUM..... BP   | PAPAYA..... PP             |
| BREADFRUIT..... BF    | PASSION FRUIT..... PF      |
| CASHEW..... Cas       | PEAR (AVOCADO).. PR        |
| COFFEE..... Co        | PLUMROSE..... PLR          |
| CUSTARD APPLE..... CA | POMERGRANATE..... PN       |
| DAMSEL..... Da        | SAPODILLA..... SAP         |
| DUNKS PLUM..... DP    | SHADDOCK..... SH           |
| FIG..... F            | SOUR ORANGE..... SO        |
| FIVE FINGERS.. FF     | SOURSOP..... SS            |
| GOLDEN APPLE... GA    | SUGAR APPLE..... SA        |
| GRAPEFRUIT..... GR    | SURINAM CHERRY..... SC     |
| GUAVA..... GU         | SWEET ORANGE..... OR       |
| HOGPLUM..... HP       | TANGERINE..... TA          |
| JAH PLUM..... JP      | WEST INDIAN CHERRY..... WC |
| JAMAICAN PLUM..... JP |                            |



PROPERTY SURVEY TRAP RECORD CARD guidelines continued.....

NUMBER OF FLIES - Enter the number of suspect flies or identified flies present in the trap. (EX: 3? If not verified as of yet Erase question mark after confirmation.)

INSPECTOR INITIALS - This column is for the initials of the survey trapper who is servicing the traps on that particular day.

PROPERTY DIAGRAM BLOCKS - These four blocks show exact trap location.

TRAPLINE- Each divided zone of areas has a trapline sequence in which traps are serviced. Traplines are given a name and Roman numeral. Enter the Trapline name. ( Ex: WINDWARD #V ).

AREA- Enter the address or the name of the area, village, district within the trapline or include the street name, number of house, or distance from a specific point in rural areas.

LOCATION OF PROPERTY- Briefly but completely describe where the trap is located within a property explaining the roads, directions to turn, landmarks, distances, etc.....

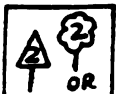
REMARKS - This space is available on the back of the card to record more information on Location of Property and pertinent information relative the the trap location.  
(EX: Go  $\frac{1}{2}$  mile up road past Arnosvale Roundabout on left; Look out for poison wood; Beware of Dog; Beehives, etc.)

OWNER - Place land owner's name in the blank. When trap is moved to a new property, fill in next blank. After two owners remaining names are listed in record book along with first and second names under PLACEMENT OF TRAPS-PROPERTY OWNERS.

HOSTS : Place full name of tree being trapped. When trap is rotated, new hosts are numbered consecutively.

EX: 1. Mango  
2. Sour Orange

DIAGRAM- Before entering on trap card, draw a rough outline of property on scrap paper showing trap location. The top of the diagram should be considered North to standardize drawings. Remember to orient the diagram and sketch in scale. Include distances and landmarks (i.e. houses, bridges, trees, etc.) (See Diagram Reference Codes- Pg 34). The diagram should be sufficient for a person not familiar with the area to service the trap. Use a straight edge. Neat, accurate and complete drawings are required. The fruit tree trap is labeled with a number and host tree code.



NON HOST -

Sometimes a preferred host has no shade, or is too short to hold a trap. Then you can place the trap in a nearby tree that would normally be a "non-host". Use the appropriate code on the diagram. 4

TRAPPERS NAME: AMY J. DREVES

CIRCLE THE TYPE OF TRAP SET: JACKSON TRIEDLURE

JACKSON TRIEDLURE  
 JACKSON TRIEDLURE  
 JACKSON TRIEDLURE  
 JACKSON TRIEDLURE  
 JACKSON TRIEDLURE

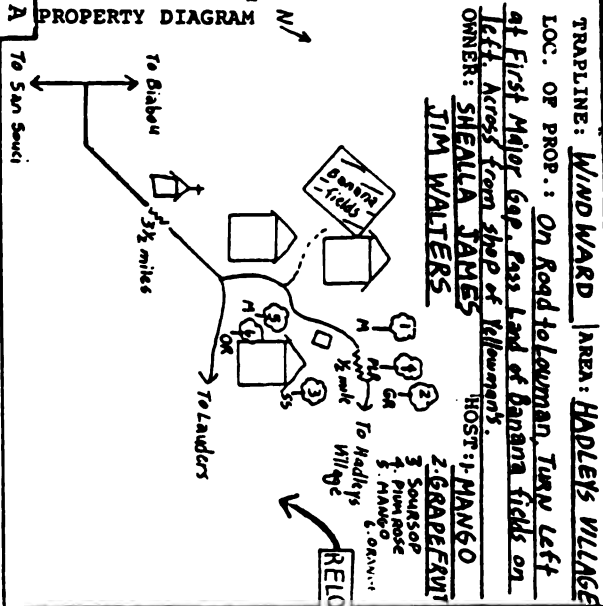
\* PROPERTY SURVEY TRAP RECORD CARD: 1  
 TRAP PLACEMENT MAP CODE: 61-01-Q1-#186  
 TRAP # : #186

ACTION CODES:  
 NM = NEW NICK  
 NI = NEW INSERT  
 X = CLOSED  
 P = PLACED  
 B = BAITED  
 C = CONTAMINATED

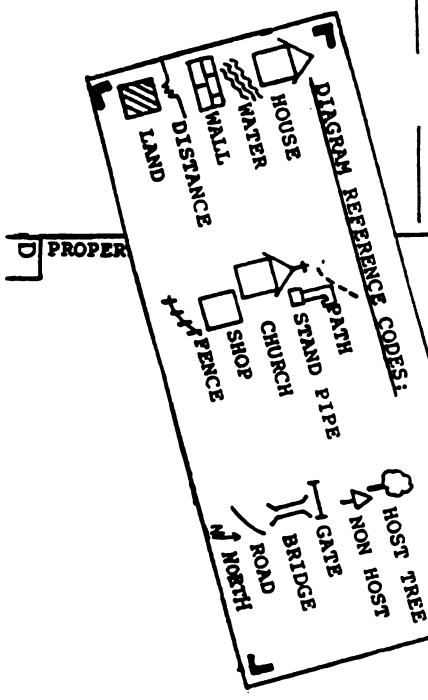
R = ROTATION  
 RL = RELOCATION  
 M = MISSING TRAP  
 BK = BROKEN MCPHAIL  
 D = DISCARDED TRAP BODY  
 SK = SKIPPED  
 V = SERVICED

DATE	LOCATION	ACTION CODE	# OF FLIES	INSPECTOR INITIALS	DATE	LOCATION	ACTION CODE	# OF FLIES	INSPECTOR INITIALS
1987									
26/5	A1	PB	-	QJD					
5/6	A1	V	-	QJD					
12/6	A2	VR	-	KC					
19/6	A3	VRB	-	KC					
24/6	A3	V	-	KC					
4/7	A4	VR	-	KC					
10/7	A4	V	-	AF					
18/7	A5	VR	-	AF					
24/7	A6	VRM	-	KC					
30/7	B1	VR	-	AF					
7/8	B1	V	-	AF					
13/8	B2	VR	-	AF					
21/8	B2	VR	-	KC					
27/8	B3	VRM	3	QJD					

PROPERTY DIAGRAM



TRAPLINE: \_\_\_\_\_ AREA: \_\_\_\_\_  
 LOC. OF PROP.: \_\_\_\_\_  
 OWNER: \_\_\_\_\_ HOST: \_\_\_\_\_



TRAPLINE: \_\_\_\_\_ AREA: \_\_\_\_\_  
 LOC. OF PROP.: \_\_\_\_\_  
 OWNER: \_\_\_\_\_ HOST: \_\_\_\_\_







**3** DAILY FIELD TRAPLINE LOG

Before going out on the trapline for the day, each trapper (or trapping team) lists the trap numbers/types in order of servicing on a page in a small spiral field notebook. A column is ruled off for the servicing action code for each trap and host tree that is being trapped. This compiled information enables the trapper to easily total all rotations, baitings, host trees trapped, etc. at the end of the day. These figures can be transferred onto the appropriate charts in the office which will eliminate the need to look back at each trap card for the information.

**4** PERCENTAGE LOSS IN TRAP BODIES AND TRAP PARTS  
(MISSING, BROKEN, AND DISCARDED)

Traps that are missing, broken (glass McPhails), or discarded (Jackson trap bodies or parts) are noted as a trap loss. Each trapper (trapping team) updates the chart daily, as necessary. The percentage is calculated for the month. If the percentage broken or missing is high, the public awareness programme should be stepped up. You may find that certain areas give you more of a problem with the disturbance of traps than other areas due to a higher percentage of children in the area, schools close by, etc.

DATE	AREA	TRAP TYPE / TRAP #	# MISSING (M) TRAPS	# BROKEN (BK) McPHAIL	# DISCARDED (D) JACKSONS	# NEW WICKS (NW)	# NEW INSERTS (NI)



**5** DAILY SERVICING RECORDS

After the servicing of a trapline, information from the Field Trapline Log or from individual Trap Cards can be used to fill out this chart (pg.42). Each trapper (trapping team) has their own chart. At the end of each week, totals are recorded. Monthly total are also calculated on a larger Servicing chart for the entire programme.

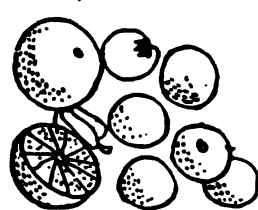
**6** DAILY OFFICE TASK DIARY

The account of the day's activities are recorded on this chart. Remarks should include the total number of each trap type serviced, host trees in season, observations relevant to trapping programme, problems with operations, explanation as to why traps could not be serviced that day, the day of vehicle servicing, etc. Each trapper (trapping group) fills out a separate chart.

DATE	AREA	TASK- Trap types/#'s	REMARKS-

**7** FRUIT COLLECTIONS/CUTTINGS/REARINGS

Properly record the fruits that are brought in to cut for larval observation or rearing purposes. If fruit is picked from a tree containing a trap, record the trap number. Once a rearing container is set up, it must be observed daily for insect changes and the moisture level should be checked. Remarks can include some descriptions, diagrams and characteristics of insect evidence, etc. These observations will aid in identifications and pest analysis studies of host fruits. One chart for all trappers (or trapping groups).

DATE	AREA	TRAP #	FRUIT TYPE	# FRUITS	OBSERVATIONS- REARINGS, REMARKS
					

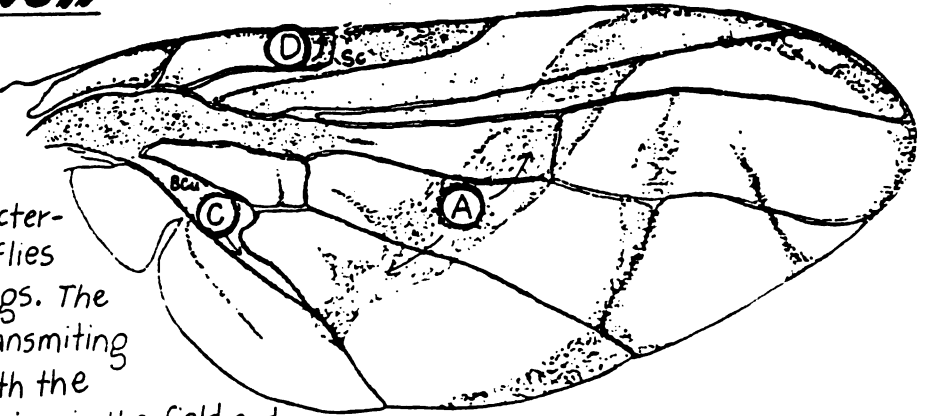
# 5 DAILY SERVICING RECORDS

DATE DAY-WEEK#	TRAP TYPES	TOTAL # PLACED	TOTAL # SERVICED	TOTAL # BAITED	TOTAL # RELOCATED	TOTAL # ROTATED	TOTAL # MISSING	TOTAL # BROKEN	TOTAL # DISCARDED	TOTAL # NEW INSERTS	TOTAL # NEW WICKS	NO. of TERRAPINS RECOVERED
M O N	MCPHAIL											
	JACKSON T											
	JACKSON M											
	JACKSON C											
T U E S	MCPHAIL											
	JACKSON T											
	JACKSON M											
	JACKSON C											
W E D	MCPHAIL											
	JACKSON T											
	JACKSON M											
	JACKSON C											
T H U R S	MCPHAIL											
	JACKSON T											
	JACKSON M											
	JACKSON C											
F R I	MCPHAIL											
	JACKSON T											
	JACKSON M											
	JACKSON C											
WEEK TOTAL												
MONTH TOTAL	MCPHAIL											
	JACKSON T											
	JACKSON M											
	JACKSON C											

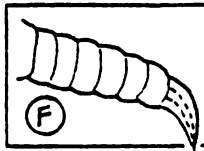
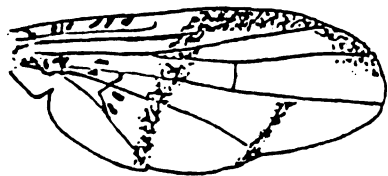
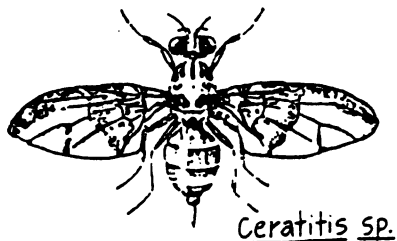
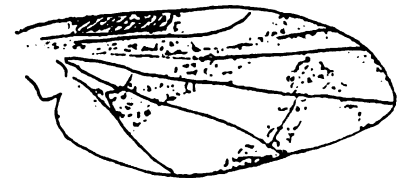
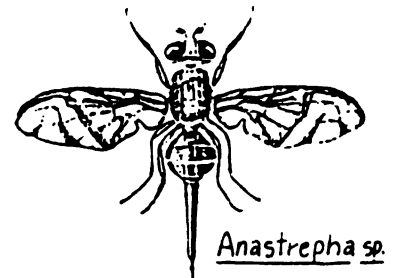
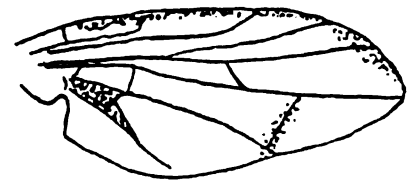
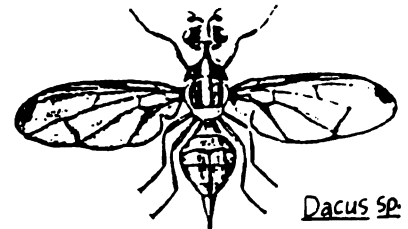


# Tephritidae Adult Identification

Bring specimens with any of the field characteristics listed below back to the lab for a closer look. Some of the most important characteristics for identifying fruit flies involve the veins of the wings. The veins are best seen by transmitting light up through the wing with the microscope light. With training in the field and lab and with continuous repetitive review of the insect finds, one can distinguish with a hand lens what is not a Tephritid fruit fly.



- (A) Wings patterned with spots or bands or darkened areas, sometimes with just a narrow band along margin of wing (Dacus sp.).
- (B) Some Tephritids are shiny but never metallic blue or green.
- (C) Anal cell (Bcu) of wing with lower posterior corner acute or with angular projection.
- (D) Subcostal vein (Sc) abruptly bent upward at 90° angle, usually fading out before reaching the coastal vein.
- (E) Pedicel (2nd antennal segment) with a dorsal longitudinal cleft - sometimes hard to see.
- (F) Apical segment or ovipositor of female abdomen elongate, conical, or tubular.



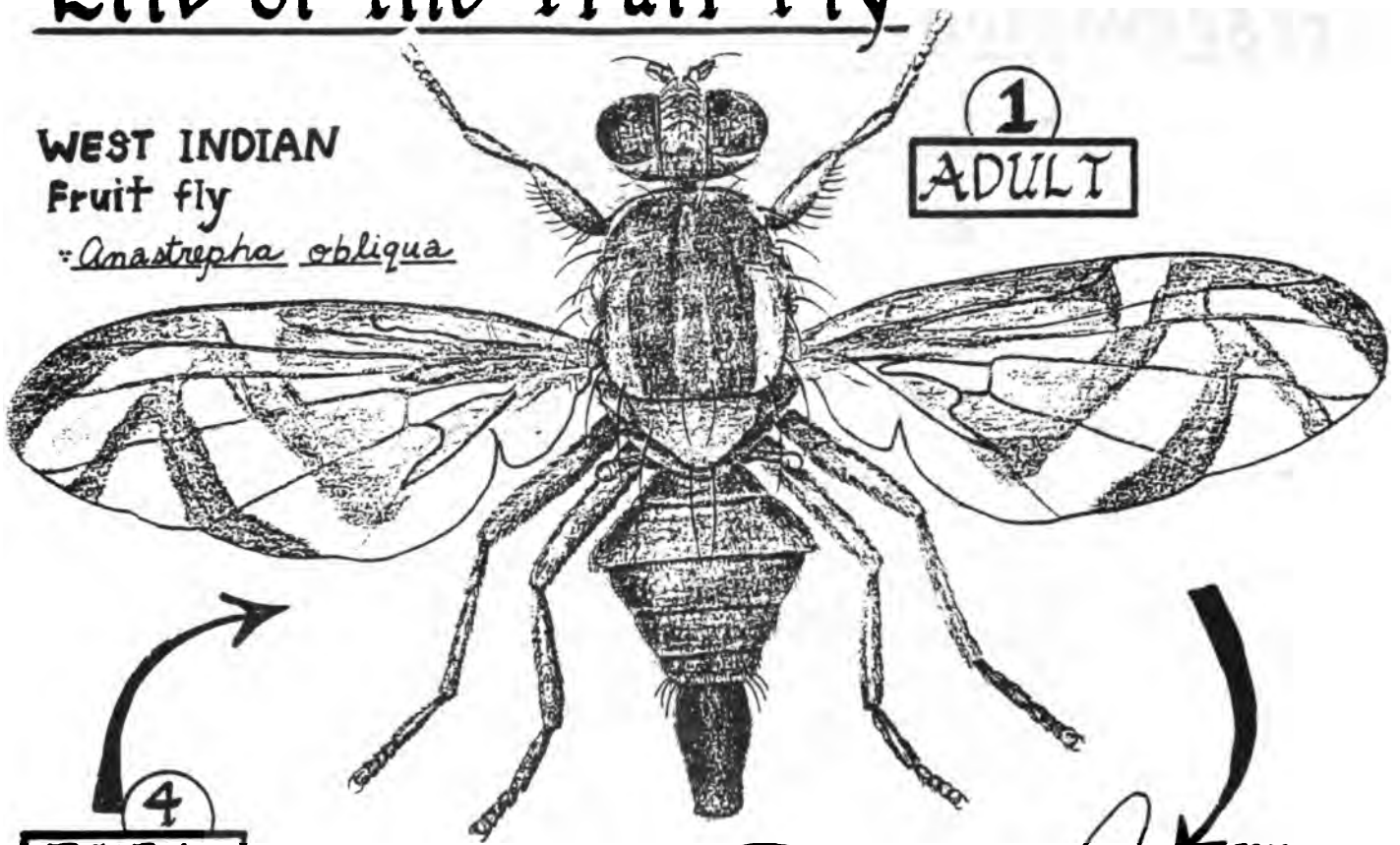
See GENERAL LIFE CYCLE of fly - page 45.

# Life of the Fruit Fly

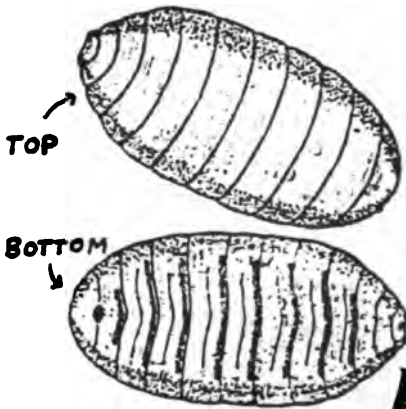
WEST INDIAN  
Fruit fly

*Anastrepha obliqua*

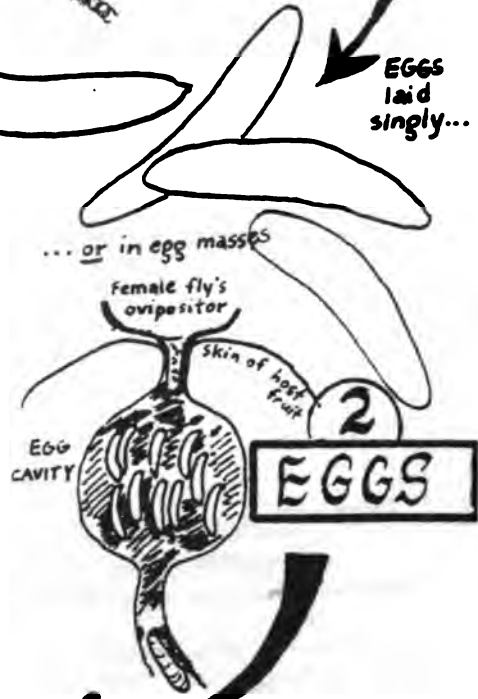
1  
ADULT



4  
PUPA

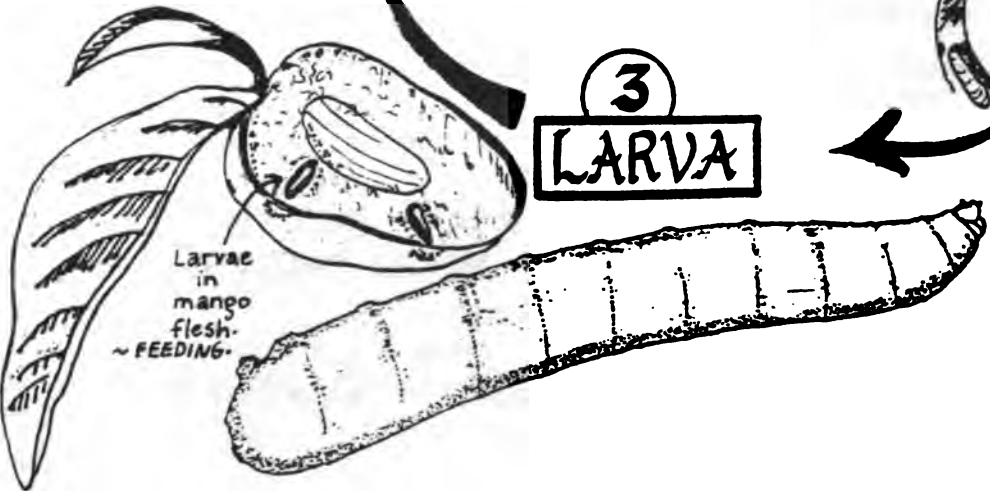


TOTAL  
life cycle  
may range  
from  
21 DAYS  
to  
1 YEAR.  
.. averaging  
1-3 MONTHS



2  
EGGS

3  
LARVA



Larvae  
in  
mango  
flesh.  
~ FEEDING ~

# Preservation:



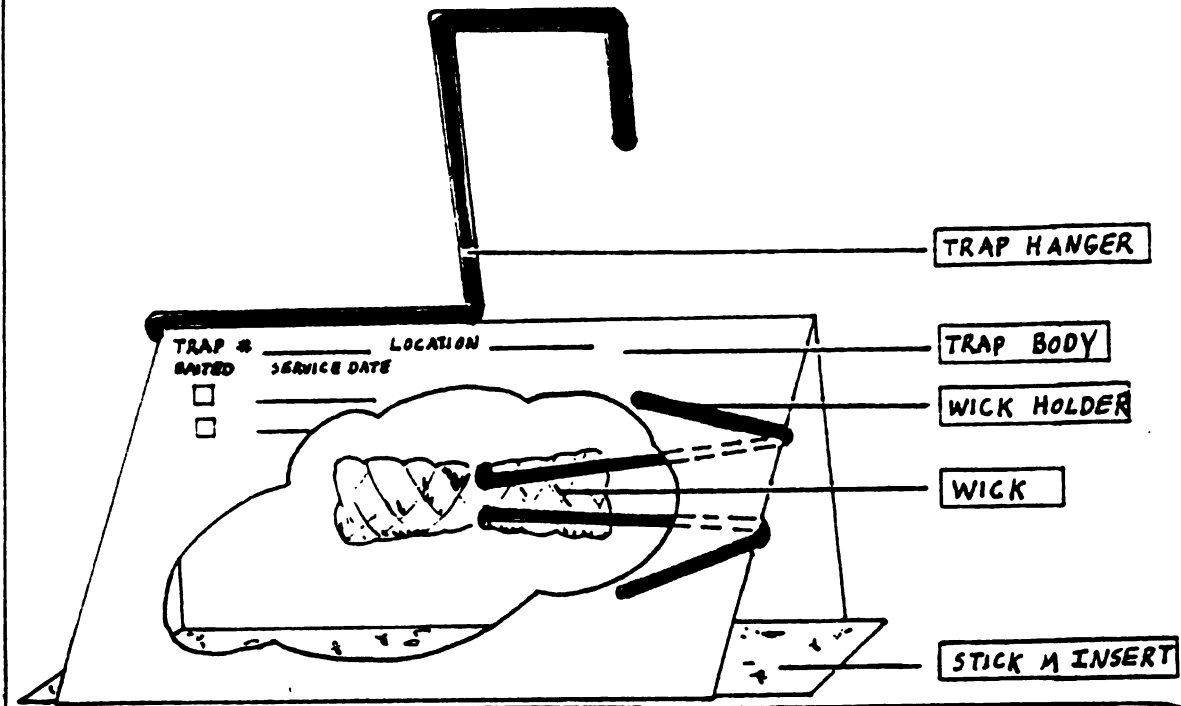
St. Vincent - Cane Garden, KINGSTOWN.  
2/17/87. McPhail #61 TRAP. GUAVA.  
AMY J. DREVES.

Preserve Tephritid adults by placing them in a vial of alcohol. All McPhail trap specimens should be washed in water several times before placing into alcohol.

In preparing Tephritid larvae obtained during fruit cutting, maximum care should be taken to prevent shriveling or discoloration. The specimen should be placed in boiling water for two minutes immersed in 50% alcohol for 15 minutes and finally transferred to a vial of 70 - 80% alcohol.

# JACKSON TRAPS

①



The delta-shaped **Jackson** trap is made of wax coated cardboard. Lure is placed on a cotton roll wick supported inside the trap by a wire holder. A sticky insert on the bottom captures flies. Inserts should be changed when dry or dirty.

- ① **JACKSON (T)** → TRIMED LURE: This lure acts primarily as a male sex attractant.

\* Use for Ceratitis spp.

- ① SERVICE TRAPS WEEKLY.
- ② REBAIT WHEN DRY AND DIRTY. 2 ml.; approx. 3 weeks.
- ③ REPLACE  $\frac{3}{8} \times 1\frac{1}{2}$ " WICK AFTER 4 months or so.

- ② **JACKSON (C)** → CUELURE + 1% DIBROM

These lures act as male sex attractants.

- ③ **JACKSON (Me)** → METHYL EUGENOL + 1% DIBROM

\* Use for Dacus spp.

- ① SERVICE TRAPS WEEKLY.
- ② REBAIT WHEN DRY AND DIRTY. 5-6 ml;

• Cuelure - approx. 8-12 weeks.

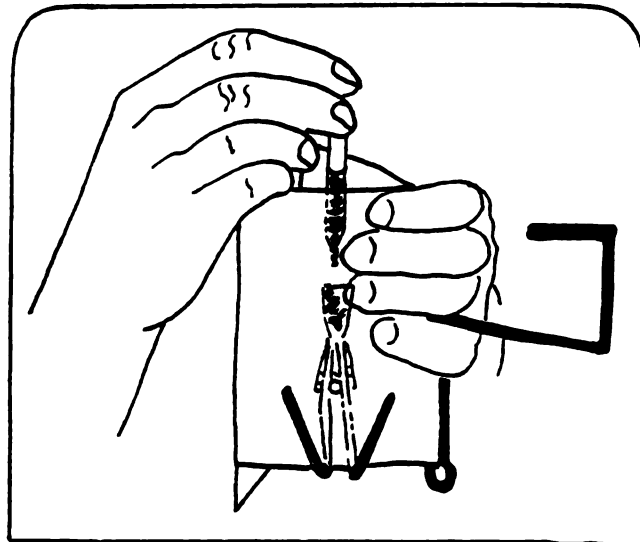
• Methyl Eugenol - approx. 4 weeks.

- ③ REPLACE  $\frac{3}{4} \times 1$ " WICK:
  - Cuelure - Replace wick each baiting.
  - Methyl Eugenol - Replace wick after 2-3 baitings.

## Servicing of Jackson Traps:

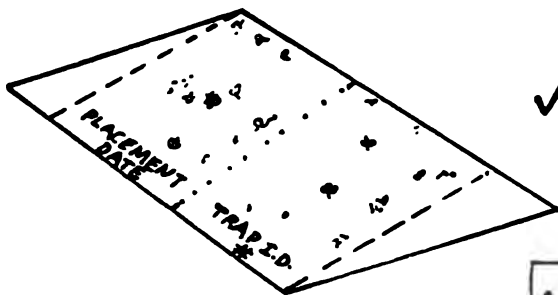
- To examine traps, remove from host tree.
  - Pull out insert and ensure that the stickem is 'sticky'.  
Apply more stickem if necessary or replace card if it is damaged or too dirty. Change inserts every 2-3 months or so. Mark new inserts with trap I.D. # and placement date.
  - Check for contamination of lure on trap body.
  - Inspect insert for Tephritidae Fruit Flies.
- IF NO FRUIT FLIES or other insects are found:

- ✓ Replace Insert
- ✓ DATE trap
- ✓ CHECK the WICK —  
BAIT if necessary.



- IF a suspicious FRUIT FLY is found:

- ✓ Set insert aside.
- ✓ Replace with new insert. Transfer information from old insert to new insert.



- ✓ Insert with fly should be folded loosely - sticky sides together, placed in a plastic bag labeled with:

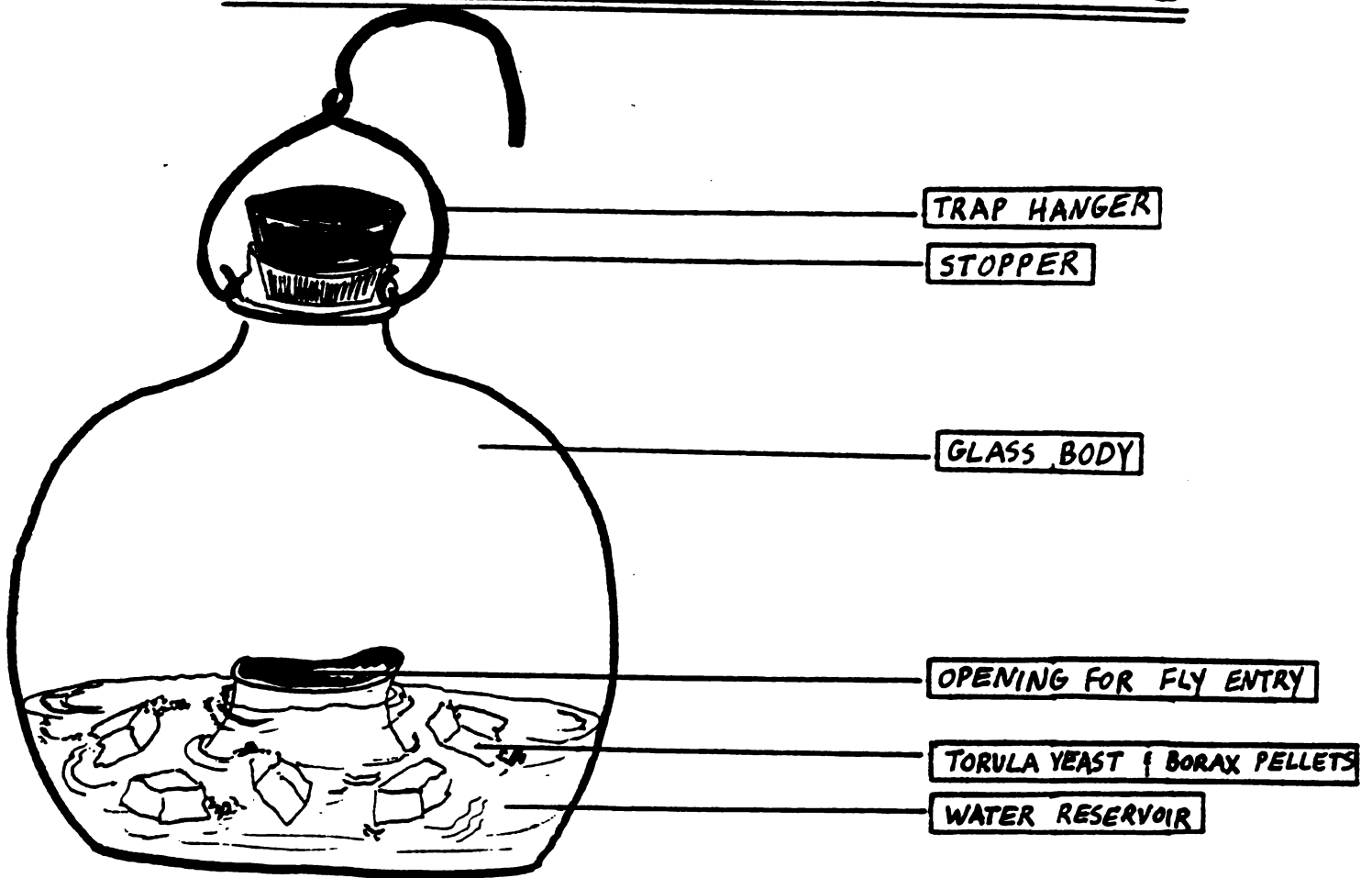
• TRAP #  
• AREA  
• DATE OF COLLECTION  
• # FLIES  
• TRAPPERS NAME



- Submit inserts to Entomologist for Identification.
- Consider Rotation or Relocation sites when placing trap back in tree.
- Complete records.



# McPhail TRAPS



The **McPhail** trap is a glass trap with a water reservoir containing dissolved food attractant compounds. Flies enter below through the opening and drown in the solution.

**McPhail** → **Torula YEAST AND BORAX PELLETS**: This bait is a food attractant.

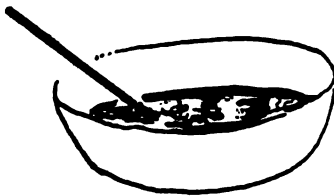
\* Use for Anastrepha spp.

- **SERVICE TRAPS WEEKLY.**
- **FILTER, CLEAN, REBAIT EACH TIME**  
 WITH ~ **500** ml of WATER (FILL BELOW LIP) OF OPENING.  
 ~ **5** PELLETS.
- **COLLECT INSECTS FROM TRAPS.**  
**STORE FLIES IN LABELED VIALS OF ALCOHOL.**

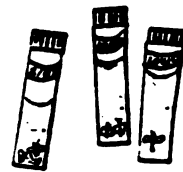
# Servicing of McPhail Traps:

- Carefully remove trap from tree.
- Inspect trap.
- Drown live flies.
- Stir contents by swirling traps without spilling.
- Remove stopper.
- Pour contents of trap over strainer into waste bucket.

Float the flies and insects by submerging strainer in a large white widemouthed bowl of clean water to review the contents thoroughly



Use forceps or a fine paintbrush to sort out flies and put the 'suspicious' flies in labeled vials of 70-80% alcohol.



Clean trap with bottle brush, scrubber and water.

Rebait: ~ 500 ml water and 5 yeast-borax pellets.

Consider relocation and rotation sites.

Complete records.

Submit vials to Entomologist for identification.



Handwritten text in purple ink, possibly a stamp or signature, located in the upper left quadrant of the page. The text is faint and difficult to decipher but appears to include the words "AGRICULTURE" and "INSTITUTE".