Aedes aegypti Handbook Series No. 4

HANDBOOK OF MOSQUITO INSPECTION PROCEDURES

Preliminary Issue
June 1966

U. S. Department of Health, Education, and Welfare
Public Health Service
Bureau of Disease Prevention and Environmental Control
National Communicable Disease Center
Aedes aegypti Eradication Program
Atlanta, Georgia 30333

HANDBOOK OF MOSQUITO INSPECTION PROCEDURES

CONTENTS

INSTRUCTOR'S GUIDE

ILLUSTRATIONS

JUNE 1966

INTRODUCTION

The *Aedes aegypti* or yellow fever mosquito is widely distributed in the United States, the Caribbean, and other parts of the tropics. The present program is part of an international campaign to eradicate *Aedes aegypti* from the New World, thus eliminating the threat of epidemics of urban yellow fever and dengue, if the virus of either of these diseases is introduced into the community either in infected mosquitoes or people (Figure 1). Beginning in the 1930's a concerted campaign has been conducted in the New World under the general coordination of the Pan-American Sanitary Bureau or its successor, the Pan-American Health Organization. The current status of the eradication program is shown in Figure 1. It is known that this mosquito breeds in water-holding containers, is usually found in close association with man, and is most abundant in the larger cities of the southern United States, but also occurs in smaller cities and even in rural areas in some states.

Figure 1.

In order to eliminate this mosquito, either by insecticide spraying or removal of breeding containers, it is necessary first, to determine the distribution. This is accomplished by means of inspection.

OBJECTIVES

The objective of inspection is the determination of the presence or absence of *Aedes aegypti* in water-holding containers or potential water-holding containers, artificial or natural, permanent, semipermanent or temporary, located on or in private, public, commercial, or residential premises. These containers are to be examined for the presence of mosquito larvae; if mosquito larvae are present, a sample is taken for positive identification at Area Headquarters. In this manner, data on distribution of *Aedes aegypti* can be assembled and a map prepared to serve as the basis for eradication operations. This map will be only as good as the thoroughness and accuracy of the inspections.

This handbook describes some of the techniques of inspection for *Aedes aegypti* larvae. These are suggested methods of work, but are not to be used as procedural policy. Inspection policies and procedures are described in the "Operational Letters" and "Guidelines" issued by Headquarters.

TYPES OF SURVEYS

The objectives of entomological surveys are to determine the presence of *Aedes aegypti*, the distribution of the species, and the relative abundance of infestations. This is accomplished by inspecting premises to find *Aedes* larvae in containers, taking a sample of specimens, and recording the findings on the block record, Form 2.1.

PREOPERATIONAL SURVEYS

These are initial inspections of premises in a new program area to make a rapid appraisal of the *Aedes aegypti* infestation. Half of the premises in one of four survey blocks are inspected, as in Figure 2. Thus, a 12.5-percent sampling of the premises in the urban and suburban areas is made to furnish a basis for initiating the area eradication program. These data make it possible to define the heavily infested condition "A" zones, the lightly infested condition "B" zones, and the zones in which no infestation is found. (See criteria on page 15.)

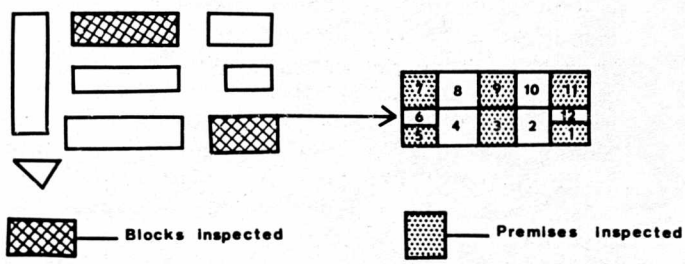


Figure 2. Preoperational surveys

Preoperational surveys are made during the period of the year most favorable for *Aedes aegypti* production, that is, when temperature and rainfall are suitable. This period is in the summer and early fall, except in the southern portions of Florida and Texas and in tropical areas, where breeding may occur all of the year.

ENCOMPASSMENT SURVEYS

All premises and all blocks are inspected, in an encompassment survey, until a block positive for *Aedes aegypti* is found. The remainder of this block and the other blocks adjacent to the positive block are omitted from inspection. Thus, as shown in Figure 3, blocks 12 through 27 were inspected and found to be negative. Block 28 was found to be positive, so it was unnecessary to inspect blocks 29, 34, 35 and 36. The inspector picks up with his inspection in block 30. Either a preoperational survey or encompassment survey may be used for the first round of operational activity.

COMPREHENSIVE SURVEYS

All premises and all blocks are inspected in a comprehensive survey. This type of survey may be made in the second and subsequent cycles, according to established policies. A comprehensive appraisal is required for the first verification survey, which is a survey to confirm eradication of *Aedes aegypti* in an area. Subsequent verification surveys will involve the inspection of every other premises in each block during two successive years at the time of maximum breeding potential.

ENCOMPASSMENT INSPECTIONS

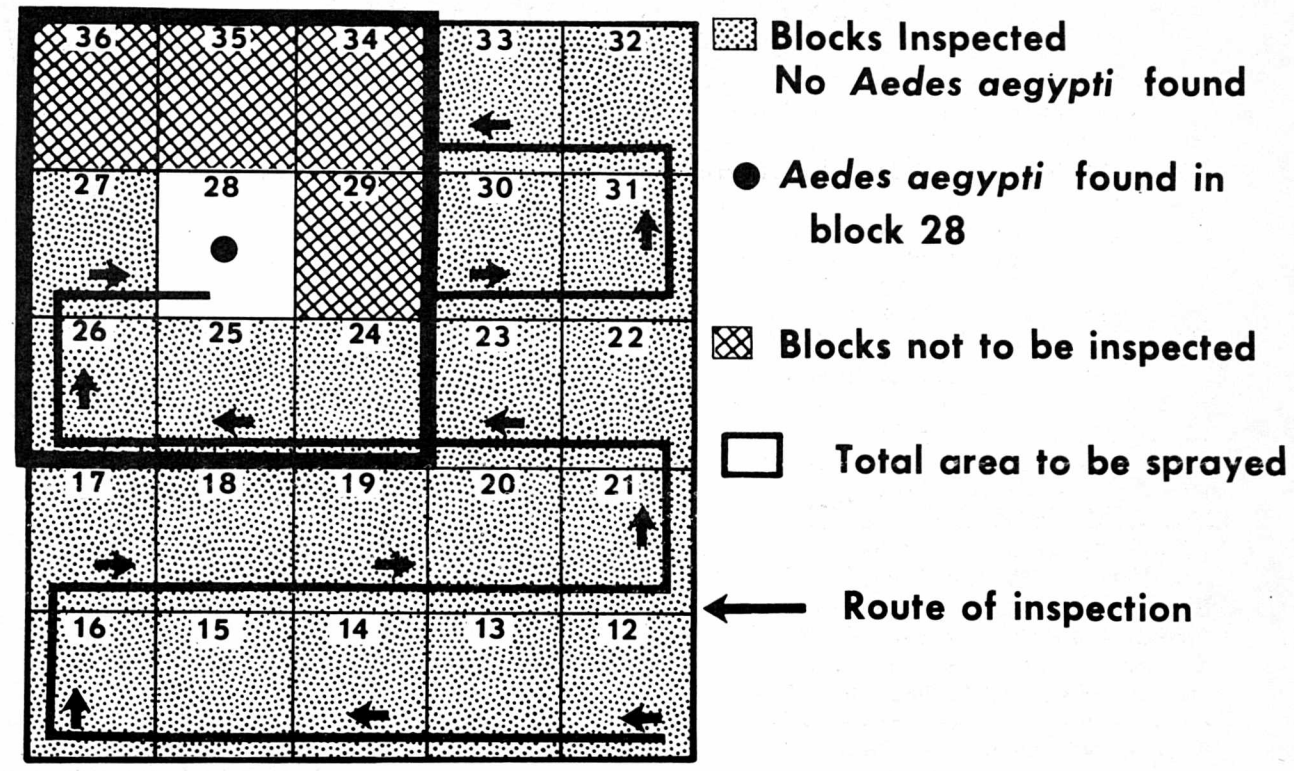


Figure 3. Encompassment inspections

SUPERVISORY INSPECTIONS

Foremen are primarily responsible for checking daily on the efficiency of the work crews. Foremen supervising inspectors will reinspect at least 5 percent of inspected premises, preferably those reported negative by the inspector. Supervisory check inspections by foremen will be made when the inspectors are not present.

Each week the assistant area supervisor will inspect at least 5 percent of the inspected premises previously given a supervisory inspection by his foremen. Inspections made by assistant area supervisors will be on premises which the foremen had previously reported as negative. The assistant area supervisor will also inspect an equal number of inspected premises which were not checked by the foremen.

SPOT-CHECK INSPECTIONS

Spot-check inspections are made and recorded by the area supervisor or assistant area supervisor or other designated persons. The purpose is to assess the actual situation with regard to presence or absence of *Aedes aegypti* as a check on inspection procedures or spraying effectiveness.

INSPECTION EQUIPMENT

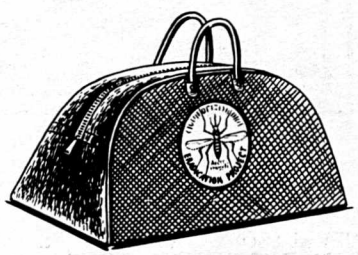
The basic inspection techniques and the essential inspection equipment are the same, irrespective of the type of survey being made. Following is a list of the items contained in a typical inspection kit:

a. Carrying case
b. Dipper
c. Syringe
d. Medicine droppers
e. Vials
f. Vial labels
g. Mirror
h. Flashlight
i. Pencil
j. Chalk
k. Forms
l. Insecticidal dust dispenser
m. Tea strainer
n. Marker stick
o. White plastic tray
p. 70% alcohol

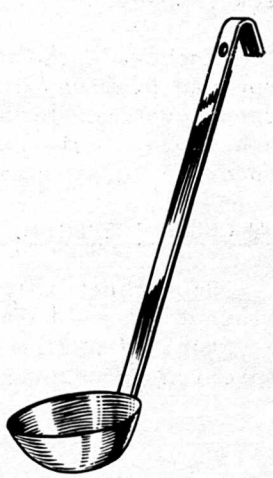
USE OF THE INSPECTION EQUIPMENT

The use of the various items of equipment may seem obvious to experienced employees. However, a paragraph describing the way each item is used on this program is given here as an aid to the beginning inspector.

a. Carrying Case - to provide a comfortable means of carrying the supplies needed for inspection. It should be maintained in a neat way at all times and must be checked each day to ensure that all supplies and equipment are on hand. It is preferable that the case be checked and expendable supplies replenished at the end of each working day.



b. Dipper - to pick up a water sample. Generally speaking, the dipper is used for large containers such as auto junk, tires, etc. Prior to dipping, the inspector avoids disturbing any larvae in the containers, either by jarring or moving the container or by letting a shadow move across it. When dipping, he makes a quick "stab" at the top of the water to take a sample before the larvae can dart below the surface. Another use of the dipper is to pour the water from jars or tin cans into the bowl of the dipper, as frequently the larvae are more easily discovered in this way. This is particularly true of the dark-colored water found in jars or cans containing plant cuttings. The inspector carefully drains off most of the dark-colored water in the original container. Then he pours the remainder into the dipper and carefully searches for larvae.



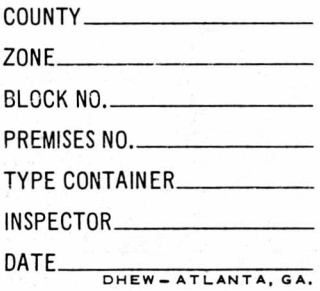
c. Syringe - to suck water from narrow-mouthed containers or those too small for the dipper. Various types of syringes are used such as basters, battery syringes, or transparent tubes of glass or plastic with rubber bulbs. The syringe is particularly useful for obtaining water from such sites as fence pipes, hollow tiles, concrete block walls, tree holes, and cemetery urns.

This water can then be squeezed into a dipper or pan and examined for larvae. When water containing larvae is sucked into the bulb, some larvae may remain there and come out during a subsequent inspection. The inspector carefully rinses out the bulb each time the syringe is used to avoid the possibility of a "false positive."

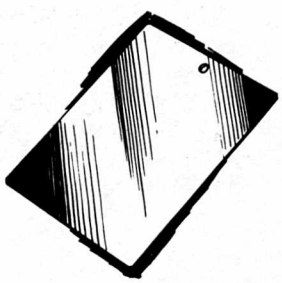
d. Medicine Droppers - to pick out individual larvae from the dipper to place them in the vials. About 5-10 larvae, particularly of the larger sizes, are drawn into the medicine dropper along with enough water to half fill the vial. Dirty water is replaced by clear, fresh water to make identification easier.

e. Vials - to hold samples of mosquito larvae for transport to headquarters.

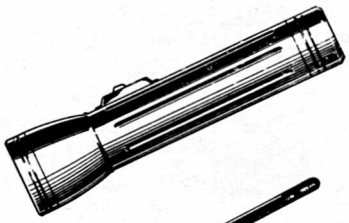
f. Labels - to identify the vials of mosquito larvae. A medium-hard lead pencil (HB or 2) must be used for the label. The information recorded is state, town, block, number, type of receptacle, name of inspector, and date.



g. Mirror - to reflect sunlight into dark containers in order to see any larvae; or, attached at an angle to the end of a pole, to check rain gutters or overhead tanks for presence of water. Some skill is required in manipulating the mirror to obtain the correct angle.



h. Flashlight - to illuminate dark containers in order to see larvae, if present. Also essential when adults are searched for.

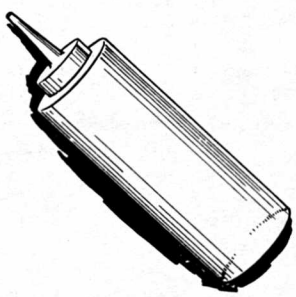


i. Pencil - to mark forms and labels. Should be good quality, medium hard (HB or 2).

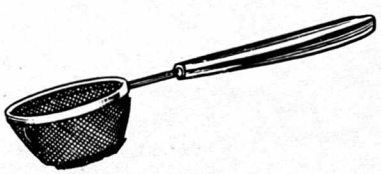
j. Chalk - to mark the southeast corner of the block under inspection. Large railroad chalk preferred.

k. Form 2.1 - Mosquito Inspection-Block Record - to record the information on the premises inspected in the block (see Figure 9). A separate sheet is used for each block inspected.

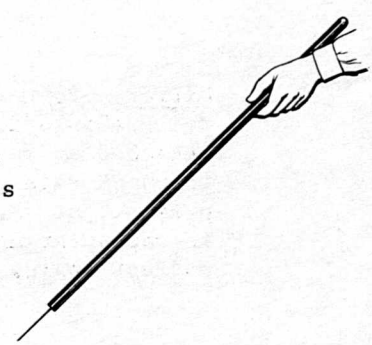
l. Insecticidal Dust Dispenser - to disperse an appropriate insecticide such as 75% DDT water-dispersible powder or 10% DDT granules. This spot treatment while the inspector is on the premises is not a substitute for regular insecticidal treatment. It is also recommended for use on mosquito larvae found in flower vases or vine bowls inside the homes, and in tree holes. The use of the insecticidal dust dispenser in these special circumstances will be determined by the area supervisor.



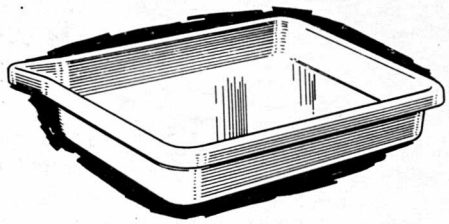
m. Tea Strainer - to strain water that may contain mosquito larvae. The tea strainer is especially useful for taking specimens from murky water and placing them in clear water for sampling.



n. Marker Stick - to indicate location of inspector. A round stick, diameter of a broom handle, about 3 feet in length with a six-inch iron spike at the end may be used. The stick is painted with a fluorescent or high reflectance paint, usually red. This marker stick is placed in a conspicuous location close to the road in front of the premises where the inspector is working. This enables the foreman and supervisors to locate the inspector quickly. At some projects, the marker stick has also been found useful to protect against unfriendly dogs.



o. White Plastic Photographic Developer Tray - to be used in examining water from dipper, syringe, or tea strainer. The water is placed in the tray and the larvae, if present, are readily observed. The tray is particularly helpful where the water is dark.



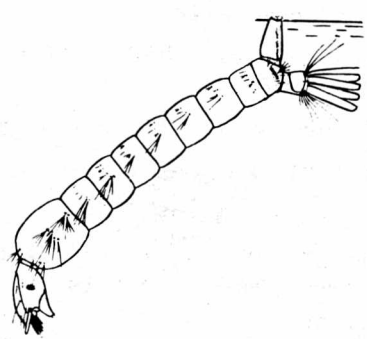
CARE OF THE INSPECTION EQUIPMENT

A good inspection cannot be made unless the equipment is available and in good working condition. Therefore it is essential that the equipment be kept clean and in a good state of repair, and if not repairable, that it be replaced. For example, the rubber bulb of the battery syringe or of the medicine dropper may leak and need replacement, or the flashlight batteries may need renewal.

FIELD RECOGNITION OF AEDES LARVAE

Initially a new inspector is required to collect all types of mosquito larvae and pupae from containers. He does this until he can differentiate between *Aedes* larvae and those of other mosquitoes such as Culex and Anopheles. When the inspector demonstrates his ability to distinguish *Aedes* from other mosquitoes, the foreman will authorize him to collect only *Aedes* larvae. Since *Aedes aegypti* larvae cannot be specifically identified in the field from other *Aedes* larvae, final determinations of the specimens are made with a microscope in the laboratory.

The following characteristics of the living *Aedes aegypti* larva will assist in making tentative determinations in the field:



a. Has an air tube that is short and barrel shaped; the air tube is generally 1½ to 2 times as long as wide.

b. When swimming, has a characteristic S-shaped or figure-8 movement, rather than a jerky, C-shaped action.

c. Is very sensitive to shadows and disturbances and stays submerged for a longer time than other mosquito larvae.

COLLECTION OF LARVAL SAMPLES

Specimens of *Aedes*-like larvae found in water-holding containers should be picked up with the medicine dropper and placed in clear water in glass vials. If the water is dirty, the inspector should replace this with clean water if available. This procedure is especially important if the larvae are to be preserved later in alcohol, since organic material may precipitate on the larvae and obscure important identification characters. The vial is to be labeled with state, town, block, number, type of receptacle, name of inspector, and date. A medium (HB or 2) lead pencil is used to print the information on the label. A pen is never used for labeling as ink blurs when immersed in water or alcohol.

PRESERVATION OF LARVAL SAMPLES

Mosquito larvae in vials are brought to the headquarters alive, as live specimens are more easily identified than dead ones. If larvae cannot be identified within 24 hours after collection, as might occur on a weekend, replace the water in the vials with alcohol so they will not deteriorate and be impossible to identify.

The vials containing living larvae must not be exposed to direct sunlight or heat for a protracted time, as the larvae are readily killed in the small amount of water. If the vials are left in the closed cab of the foreman's truck, which is then allowed to stand in the full sun, the larvae will be killed by the heat that builds up. It is best to keep the larvae in vials in the inspector's bag and to keep the bag in the shade, if possible.

TYPES OF BREEDING CONTAINERS

Every inspector must know the types of containers in which *Aedes aegypti* deposit their eggs and which, therefore, are the places where he will look for larvae.

Biologically, the female *Aedes aegypti* requires a firm surface on which to attach the eggs. Consequently, the eggs of *Aedes aegypti* are not found in ground pools, swamps, or ponds with soft dirt sides. On the other hand, any water-holding container, big or small, that has firm sides may be a breeding site. Larvae are found more frequently in shaded than in sunny locations. Following is a partial list of places where *Aedes aegypti* are commonly found (Figure 4):

Tires

Auto parts

Containers with plant cuttings in water

Boats

Cisterns

Tin cans and bottles

Plastic containers

Plumbing fixtures stored in the open

Rain barrels

Bird baths

Traps of drain, not in use

Animal drinking pans

Wooden barrels or tubs

Earthenware pots

Ornamental ponds without fish

Buckets and pails

Cement mixers, other construction equipment

Discarded household appliances

Cement blocks

Flush tanks, not in use

Drums or barrels, including the rimmed tops of barrels

Wading pools

Cemetery urns

Flower containers

Storm-drain catch basins

Air conditioners

Roof gutters, shaded and clogged

Tarpaulin

Inner tube testers at service stations

Other less common water-holding containers must be looked for and examined. As the inspector gains experience, other types of water-holding containers will be discovered.

Aedes aegypti are often found in the following natural sites:

Tree holes

Bamboo stumps or sections

Bromeliads

Coconut shells

Leaf axils

Rock holes

All types of water-holding containers must be examined.

Aedes aegypti larvae are usually found in relatively clean water, but they do occur in all types of water except extremely polluted water. They are usually not found in cesspools or water highly contaminated with urine and feces.

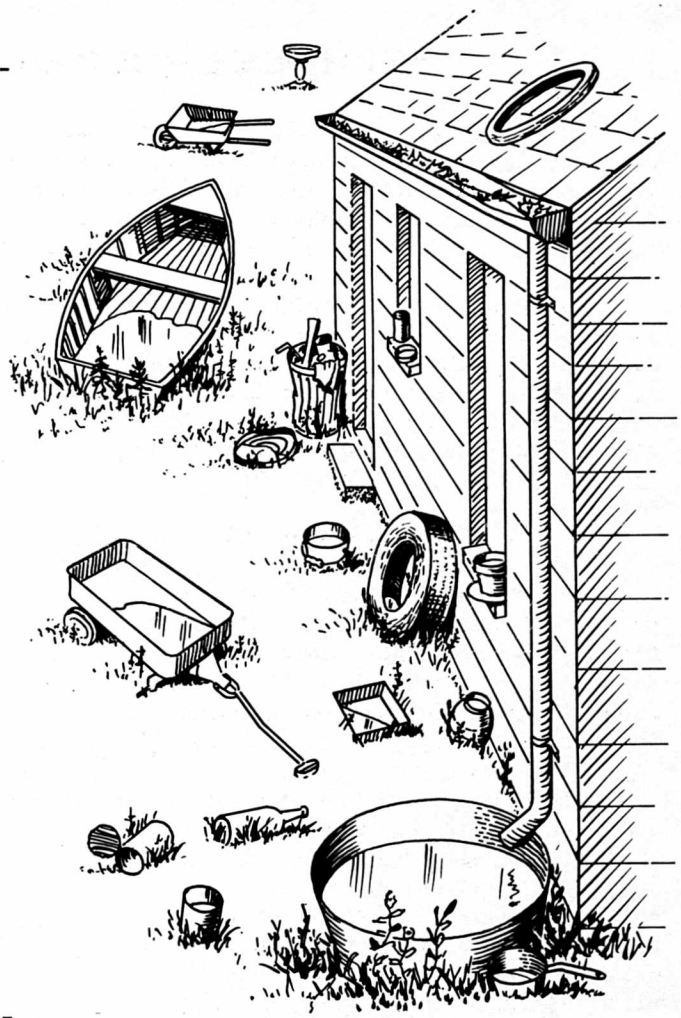


Figure 4. Types of breeding containers

It is useful to maintain a check list of containers with *Aedes aegypti* larvae, which helps to stimulate inspectors in seeking all types. The check list indicates the types of containers that are most significant for the area. In one area, for example, more than 60% of the *Aedes aegypti* discovered were in tires, buckets and pails, and containers with plant cuttings. However, no particular type of container should be emphasized, as the tendency of the inspectors might then be to concentrate on that kind and to overlook other breeding sites. The total production of many small containers may be more significant than that of one or two large containers.

HOUSEHOLDER APPROACH

The cooperation of the public is essential to the *Aedes aegypti* eradication program. This requires a good approach to the householder. The inspector should first identify himself to the occupant (Figure 5) before making an inspection. He should always enter the premises by the sidewalk to the front door. He must not pass from property to property in the back or across property lines.

The inspector tells the occupant, courteously and politely, that he is working with the state or local board of health and is making an inspection for containers that might be producing mosquitoes. He must always carry an identification card, even when in uniform.

The inspector asks for permission to inspect the premises. He also inquires if there are vine bowls or flower vases or other containers holding water in the house. If so, he requests that they be brought out for inspection.

The inspector must not enter houses unless so instructed by his supervisor. It is helpful if the householder accompanies him on the exterior inspection to observe the types of containers that contain mosquito larvae and the advantage of eliminating them (Figure 6). The inspector answers questions concisely, avoiding lengthy explanations or long conversations.

Figure 5. Inspector identifying himself to occupant

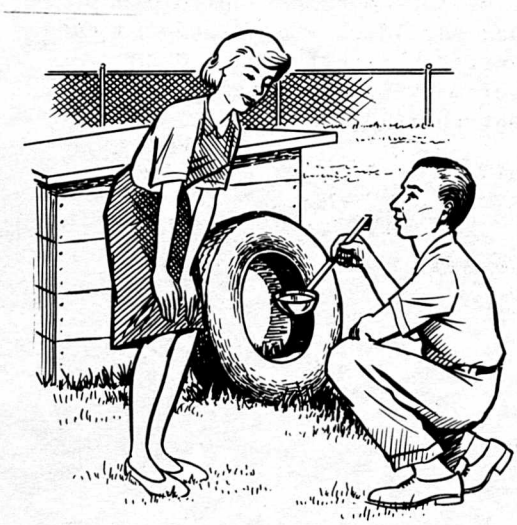


Figure 6. Inspector showing container to householder

SOURCE REDUCTION AT HOUSEHOLDER LEVEL

One of the most effective aids to the eradication program is the elimination or alteration of potential water-holding containers by the householder. This requires that he understand the types of domestic containers that may be involved. The inspector should try, during his personal contact with the householder, to point out actual or potential breeding containers and suggest methods to alter or eliminate them. For example, plant cuttings can be started in moist sand instead of water, and tires or other containers can be stored under cover, protected from rain.

The inspectors and foremen must not remove containers from premises unless specifically instructed to do so by their supervisor.

INSPECTION PROCEDURES

At most projects, the inspector is assigned to make a comprehensive survey of a block (that is to inspect every premises). He begins at the southeast corner of the block. On the corner he marks with chalk the date, the time, and his initials. This enables the supervisor to know where the inspector is working (Figure 7). The days of the month are written in Arabic numerals and the months in Roman numerals. Thus, if he starts in a block at the beginning of May 3, 1966, he writes "8:00 AM, 3-V-66" and his initials "A.S." as in Figure 8. Proceeding clockwise around the block, he systematically inspects each premises. At each corner he places an arrow to show he has advanced beyond that point.

At each premises, the inspector places the marker stick in a conspicuous location close to the street so that his foreman can locate him easily. He enters at the front, politely explains the purpose of his call, and requests permission from an adult occupant of the house to make the inspection. After the inspector has received permission to inspect a premises, he starts at the right of the entrance and proceeds around the house in a counter clockwise direction (Figure 8).

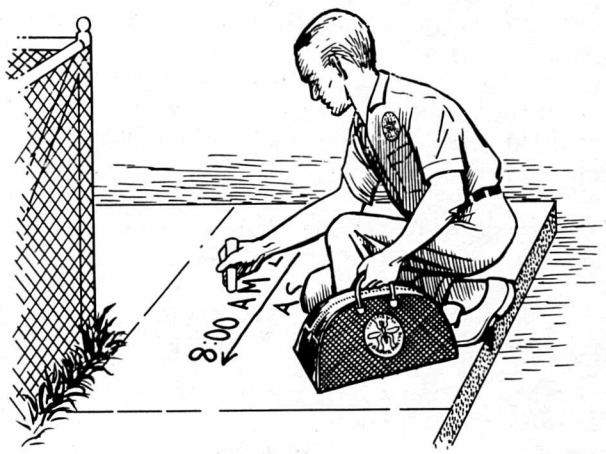


Figure 7. Inspector showing location of next work area

Most people readily notice objects at or below eye level. The inspector must train himself to look for elevated water containers that are possible breeding sites, for example, water-cooled air conditioners, tree holes, flower urns, and pots hanging from trees. Although these overhead containers may be difficult to reach, they must be inspected for larvae. If the inspector cannot safely reach them, he must report them to his foreman, who will obtain a ladder or make other arrangements to allow safe inspection.

Inspection for *Aedes aegypti* requires a careful search for the many artificial containers in which they may breed. All containers of water are examined. The inspector proceeds slowly and carefully in searching for larvae. He must avoid casting shadows on the water or bumping the containers or he may fail to see the larvae because they dive to the bottom. They may remain there for a minute or more. When a container with water is found, the inspector observes the surface of the water, looking for mosquito larvae,which may be resting quietly or moving in their characteristic fashion. If no larvae or pupae are seen at the

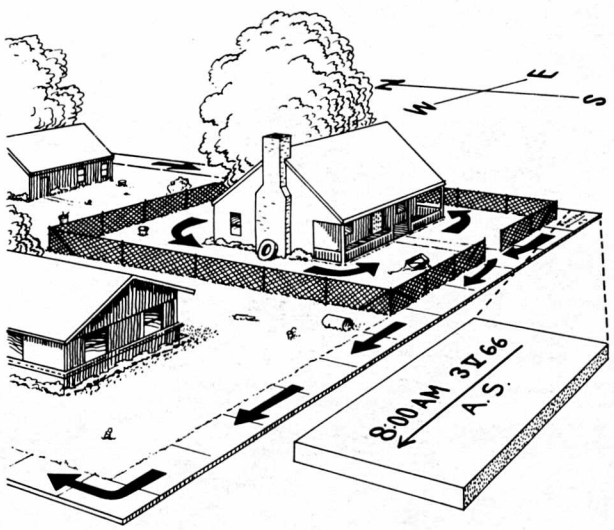


Figure 8. Diagram of direction in which inspector must travel

surface, he taps the container gently and watches for motion. When checking a large container, if no larvae are seen, he makes several quick dips beneath the surface of the water toward the sides of the container. When checking small containers, the water may be poured into a dipper where the larvae are seen more easily. A small tea strainer is useful for removing larvae from the water in containers that are difficult to look into, such as tires. When additional light is necessary to inspect for mosquito larvae, he uses the flashlight or the mirror.

If the occupant refuses permission for the inspection, the inspector does not argue and is not demanding. He politely explains that cooperation of the public is necessary for the success of the program to eliminate this mosquito. Upon further refusal, the inspector politely thanks the occupant and immediately leaves the premises by the front entrance. The addresses of all premises where permission to inspect has been refused are recorded on Form 2.1 and referred to the foreman. The foreman will visit these premises and make an additional effort to obtain approval for inspection.

It is essential in this eradication program that all positive premises be sprayed. Therefore, acceptance of the program during the inspection stage is essential. Most project areas have made an excellent record in obtaining consent for inspection or treatment. This has resulted from a considerable effort expended in maintaining good public relations, and in revisiting premises where entry has been refused during the first visit.

Generally, permission is not required for the inspection of vacant lots or obviously unoccupied premises.

When inspection of a block has been completed, the inspector draws a diagonal line through the original chalk marking at the southeast corner.

RECORDS

Mosquito Inspection-Block Record (Form 2.1)

The Mosquito Inspection-Block Record (Form 2.1) is the basic report from which subsequent records, reports, and analyses of an operational and evaluative nature are based. For this reason it is essential that all operational personnel understand the record form, and make every effort to see that it is accurately completed (Figure 9).

All premises in every block must be listed and all inspections and treatments recorded on Form 2.1. Thoroughness in recording field data is essential for a valid analysis of *Aedes aegypti* infestations on which to base eradication activities. It also strengthens supervision by requiring the inspector or sprayman to recognize and define premises, and to provide the supervisor detailed information for evaluating the completeness of the work.

Every day, the inspector receives from his foreman a Mosquito Inspection - Block Record (Form 2.1, page 14), for each block to be inspected. He completes the form while working in the block, and returns all completed block records to the foreman at the end of the work day. A block is considered complete when all assigned premises have been visited, whether or not they were inspected. For example, a premises may be visited but may not be inspected because it was closed.

On many projects, the inspector receives Form 2.1 with the following information already recorded: County, Cycle, Zone, and Block Number. This information is obtainable from area headquarters. Usually identification data - County, Zone, and Block Number,are obtainable from a U. S. Census map or other maps maintained in headquarters. Cycle refers to the number of the inspection cycle being reported upon and is obtainable from headquarters.

Date - The date when the inspection of the block was completed.

Inspector - The initials or name of the inspector.

The remainder of the form is filled in by the inspector. Before beginning work in a block, he enters his name in the Form 2.1 for that block. When he completes work in that block he enters the completion date in the Date space and at the same time enters the Block Rating. He determines this rating according to the following criteria:

1. Good - Virtually no deterioration of structures.
2. Fair - Some deterioration, but less than 50% of the structures dilapidated.
3. Poor - Slum areas, or the majority of the structures dilapidated.

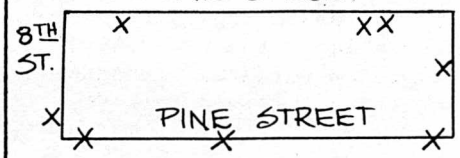
Figure 9

MOSQUITO INSPECTION-BLOCK RECORD

County EVANS Cycle 6

Sector H Zone 14A Block No. 46

Date JULY 15, 1966 Inspector PEAKE Block Rating FAIR



No.	Premises Address	Exterior							Interior						
		Closed	Refused	Inspected	With *Ae. aegypti*	Type container with *Ae. aegypti*	With other mosquitoes	Treated by Inspector	Closed	Refused	Inspected	With *Ae. aegypti*	Type container with *Ae. aegypti*	Treated by Inspector	
1	328 7TH St.			✓	O										
2	VACANT LOT PINE STREET			✓	X	TIN BUCKET									
3	1121 PINE St.			✓	O		✓								
4	1123 PINE St.		✓												BCC
5	1125 PINE St.			✓	X	TIRE									
6	1129 PINE St.			✓	O										
7	1133 PINE St.			✓	O		✓								
8	1137 PINE St.			✓	O										
9	1143 PINE St.			✓	X	DOG DISH									
10	222 8TH St.			✓	X	REFRIGERATOR									
11	228 8TH St.	✓			O		FENCED, LOCKED GATE								BCC
12	336 8TH St.			✓	O										BCC
13	338 8TH St.			✓	O										
14	VACANT LOT 8TH St.			✓	O										
15	446 8TH St.			✓	O										
16	1002 OAK St.			✓	X	PLANTER									
17	1008 OAK St.			✓	O										
18	1010 OAK St.			✓	X	GARBAGE CAN									
19	1016 OAK St.			✓	X	TIRE									
20	1022 OAK St.			✓	O										
21	424 7TH St.			✓	O										
22	420 7TH St.			✓	O										
23	416 7TH St.			✓	O		✓								
24	410 7TH St.			✓	O										
25	402 7TH ST. EXTERIOR			✓	O										
26	402 7th ST. APT. A								✓						
27	402 7TH ST. APT. B										✓	X	FLOWER VASE		
28	402 7TH ST. APT. C										✓	O			
TOTAL				24	7		1		1	0	2	1			

PHS 2.1 (CDC) REV. 6-65

BCC

As the inspector works around the block, he fills in the body of the form. Every premises must be recorded on the form, and the inspection data then entered. under either the Exterior heading or the Interior heading, whichever is appropriate. The following detailed explanations should help make sure that the Form 2.1 is correctly and completely filled out.

Premises Address - The house number and the street name are filled in before the inspector contacts the occupant. In the absence of a house or premises number, some other identifying information should be entered, as in items 2 and 14 of Figure 9. In cases where interior as well as exterior inspections are required, it may be necessary to list each apartment or unit within a building. When this happens, several premises may have the same exterior address but different apartment numbers or other designations.

The number assigned a premises should be consistent from cycle to cycle; but this is more or less assured, since it is required that inspections be started on the southeast corner of the block and proceed clockwise around it.

Closed - This column is checked when it is impossible to gain entry because the premises was locked.

Refused - This column is checked when the occupant refused permission to inspect.

Inspected - When an inspection is made, check this column, and then fill out the next three columns to show findings.

With *Ae. aegypti* - The inspector puts an "X" in the block if *Aedes* are found, an "O" if none are found.

Type container with *Ae. aegypti* - Here the specific name of the container found positive is written in. If more space is needed, the reverse side of the form may be used.

With other mosquitoes - A "✓" is marked in the space for premises where larvae of mosquitoes other than *Aedes* are found.

Treated by Inspector - Here a record is made of any insecticidal treatment applied by the inspector during the inspection process.

Use of Data Recorded in Form 2.1

Data from the block record (Form 2.1) are posted on maps and summary forms to furnish information for evaluation of conditions and for planning future operations. These data form the basis for determining the block indices, and for outlining the "A" zones and "B" zones, which are defined as follows:

Condition "A" zones have a relatively heavy and widespread infestation of *Aedes aegypti* with a block index greater than 20 and a premises index greater than 2.5.

Condition "B" zones include all rural zones, and such urban and suburban zones as initially have relatively light, scattered *Aedes aegypti* infestations. The block indices are less than 20 and the premises indices less than 2.5.

The premises index (plural: indices) is a measure of the degree of *Aedes aegypti* infestation of the premises in a zone or area as determined by entomological inspections. The formula for determining this is:

$$\frac{\text{No. of infested premises} \times 100}{\text{Total no. of premises inspected}} = \text{Premises Index}$$

Example: In zone 17, 4500 premises were inspected and 150 were found to be positive for *Aedes aegypti*. What is the premises index?

$$\frac{\cancel{150 \text{ premises}} \times 100}{\frac{\cancel{4500 \text{ premises}}}{30}} = 3.3$$ (an "A" zone as premises index is more than 2.5)

The block index is a measure of the degree of *Aedes aegypti* infestation of the blocks in a zone or area as determined by entomological inspections. The formula for determining this is:

$$\frac{\text{No. of infested blocks} \times 100}{\text{Total no. of blocks inspected}} = \text{Block Index}$$

Example: In zone 3, 300 blocks were inspected and 50 were found to be positive. What is the block index?

$$\frac{50 \text{ blocks} \times \cancel{100}}{\frac{\cancel{300 \text{ blocks}}}{3}} = 16.7$$ (a "B" zone as block index is less than 20)

These indices are calculated for each zone after all of the blocks have been inspected and the specimens identified. The block and premises indices are utilized in evaluating the *Aedes aegypti* infestation in a zone, initially, and the effectiveness of eradication measures. Zones are classified in either "A" or "B" categories according to the extent and intensity of the infestation.

STANDARDIZATION OF PROCEDURES

The inspection of premises for *Aedes aegypti* larvae is a time-consuming and expensive activity of the eradication program, and every effort must be made to make it efficient and effective. Before reporting a premises negative, the inspector must feel that he has made a thorough inspection. However, even the best inspector may occasionally overlook or miss a positive container. To reduce this possibility to a minimum, a standard procedure of inspection must be established and followed.

SAFETY PRECAUTIONS

It is imperative that the inspector examine all parts of a premises but that he take extra precaution to avoid injury during the course of his work. This will be particularly important when inspecting cluttered yards and vacant lots overgrown with weeds. He must be on the lookout for broken bottles and other glass fragments, for nails protruding from old lumber, and for snakes. Dogs that will bite are a problem sometimes, but most householders will confine or restrain their pets if requested to do so.

The inspector must drive safely and obey all traffic regulations in his area.

He must promptly report all personal injuries or property damage to the foreman, who in turn will notify the area supervisor.

SUPERVISION

The inspector works under the supervision of the foreman at all times. The foreman determines daily work assignments, time allotted, and itineraries, and checks reports. He never lets the inspectors work alone in the field, but moves about and spends some time with each of them in the field every day. The foreman indicates on the inspector's Form 2.1 those premises where he observed the man's work. It is by regular and frequent supervisory inspections on premises already inspected, and by observation of the inspector's approach to the householder and of his skill in inspecting for *Aedes* mosquito larvae, that the foreman can assist, train, and guide the inspectors to more thorough and careful work.

The basic objective of the *Aedes aegypti* inspection program is to find all *Aedes aegypti* infestations. Therefore, the objective of training for inspectors is development of the ability to find all infestations and to miss none.

INSTRUCTOR'S GUIDE

LARVAL INSPECTION TECHNIQUES TRAINING COURSE

To obtain maximum results through a training course, the instructor must follow certain simple rules. He should:

1. Read the lesson and the instructor's guide several times.

2. Present the course in a classroom that is well ventilated, properly lighted, and not crowded.

3. Be prepared. Have his demonstration material, papers, mosquito larvae, film, slides, etc., on hand in advance of the date of the course.

4. Be brief, and give breaks at frequent intervals.

5. Be informal and practical.

This course outline is presented to aid in the training of inspectors. To obtain maximum benefit, it should be supplemented with slides, motion pictures on inspection, demonstrations of typical containers with larvae, and more particularly, field demonstrations and practice.

THE USE OF INSPECTION EQUIPMENT

The instructor should demonstrate each item of inspection equipment, explaining the purpose of each. He should encourage questions and discussions from the individual trainees on the use of various items. It is important to demonstrate how *Aedes aegypti* larvae dive to the bottom of containers when disturbed and their reaction to light and shadow.

HOUSEHOLDER APPROACH

A class exercise in which each trainee demonstrates his approach to the householder has been a useful training method. The trainee should use the most acceptable phrasing for the area in which he is working, such as "I am an inspector from the Department of Health. I would like permission to examine your yard for water-holding containers that may be breeding mosquitoes." The trainees should practice their lines until they can say them with confidence.

In another part of the class exercise, one trainee acts the part of a householder who refuses. Other trainees are selected to try a different approach in order to obtain permission. This practice is continued until the approach is smooth and confident and all trainees have had an opportunity to participate.

INSPECTION PROCEDURES

The trainees are taken in small groups under the leadership of an area supervisor, assistant area supervisor, foreman, or an experienced inspector, and actually shown places where one can expect to find *Aedes aegypti*. The field exercise should emphasize the importance of artificial containers. It is best if no more than four

trainees are with each leader during the field practice. If the class is too large, it may be split into small groups. One group can practice collecting larvae from typical containers with the battery syringe, dipper, and medicine droppers, and observe larval behavior. Another group can practice field recognition of *Aedes* larvae.

SOURCE REDUCTION AT HOUSEHOLDER LEVEL

The trainees practice various approaches to the householder to promote container elimination. The various alternatives to growing plant cuttings in water, and proper storage or elimination of unnecessary containers, are discussed.

REPORTS AND RECORDS

Copies of Form 2.1 are distributed and an explanation is given of each item. Each trainee fills out several forms to insure that he clearly understands all the items.

STANDARDIZATION OF PROCEDURES

The importance of standard procedures is emphasized. It is shown how containers are missed if systematic inspections are not carried out. If time permits, a demonstration area is set up having some obvious and some concealed containers. Each trainee inspects the area methodically, and reports all containers he observes.

SAFETY PRECAUTIONS

The inspectors are key personnel in the program and must be made to feel that the supervisors have a personal interest in their well-being. Supervisors must emphasize that safety precautions are for their benefit. The best way to show concern for inspectors is through training in safety and accident prevention.

SUPERVISION

The instructor emphasizes that the foreman is interested in the inspector as a person and will help him as much as possible; that the inspector should not hesitate to ask questions or ask for help if he feels he cannot carry out the work assigned. The work of the inspector is the basis for the *Aedes aegypti* eradication program. He must feel that his work is essential and that he is important to the program.

SUGGESTED FILMS

"Enemy in Your Home",- M-911, 13 minutes, color-sound, CDC, 1965.
"The *Aedes aegypti* Inspector",-M-1151, 23 minutes, color-sound, CDC, 1966.
"Biology and Control of Domestic Mosquitoes",-M-357, 22 minutes, color-sound, CDC, 1960.