TG 119

UNITED STATES ARMY ENVIRONMENTAL HYGIENE AGENCY

ABERDEEN. PROVING **GROUND,** MD **21010**

COLLECTING AND SHIPPING INSECTS
FOR RESISTANCE TESTING

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Guidance is provided for collecting and shipping cockroaches, house flies and mosquitoes. Also included are lists of collecting materials and the minimum numbers of specimens required for resistance testing within USAEHA.

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DEPARTMENT OF THE ARMY
U. S. ARMY ENVIRONMENTAL HYGIENE AGENCY
ABERDEEN PROVING GROUND, MARYLAND 21010

HSE-RP/WP Technical Guide No. 119 August 1980

COLLECTING AND SHIPPING INSECTS FOR RESISTANCE TESTING

1. AUTHORITY. AR 420-76, Pest Control Services, 15 July 1978.

2. REFERENCE. TM 5-632, Military Entomology Operational Handbook, December 1971.

3. PURPOSE. To describe methods and materials for collecting arthropods for pesticide susceptibility testing conducted at US Army Environmental Hygiene Agency (USAEHA).

4. GENERAL.

a. Minimum numbers of specimens to be accepted for colonization and resistance testing are as follows:

Cockroaches: any single species, any life stage	200
House Flies:	
Field-collected adults or larvae	200
Eggs from ovitraps or from field-collected adults	500
Mosquitoes:	
Field-collected larvae	1000*
Eggs collected in ovitraps (*Aedes* spp)	2000*
Field-collected egg rafts (*Culex* spp)	100*

These minimum numbers have been established to insure that sufficient specimens are available to complete laboratory testing within two generations, and to insure a valid sample size. In many situations it will be possible to collect more than the minimum number. Every effort should be made to collect as many specimens as possible. A few extra minutes spent collecting in the field will insure a more valid sample size, allow testing to be completed in a shorter time, and save many hours of laboratory rearing.

b. Cockroaches collected from a single building such as a mess hall will be kept separate from specimens collected at any other building on an installation. Tests have shown that populations from different buildings of the same installation frequently vary in susceptibility levels. Cockroaches collected from contiguous units such as apartments or duplexes should be pooled if avenues of cockroach movement between the units are readily available.

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* Tentative

C. House flies collected on a single installation will normally be pooled to form a single colony. House flies are generally considered capable of flying several miles; it is expected that flies within a 5 or 10 mile area would be part of the same population, especially if breeding sites are close together or if animals or garbage vehicles routinely move through the area. An exception to pooling might occur if there is a sufficient physical or other barrier to prevent flies from moving from one infestation site to another. For example, if a fly-infested landfill is located 10-15 miles from other sources of fly infestations on an installation, then specimens from that population would be kept separate from a collection made in the cantonment area.

d. Mosquitoes will not normally be colonized for resistance testing. When possible larval tests will be conducted in the field. Additional larvae will be collected and brought back to the laboratory and tests will be conducted on the adults emerging from them. Eggs can also be shipped to the laboratory for subsequent testing in the adult or larval stage. The minimum numbers given in paragraph 4a may vary, depending on pupation and emergence rates and on survival during shipment and transport, If tests with more than one or two pesticides are desired, additional specimens will have to be collected.

e. The collecting methods presented in the next section will not be ideal for all situations. The methods of choice will depend on such factors as population density, habitat and available equipment. As many methods as possible should be attempted, and in some circumstances it may be necessary to modify the procedures.

5. COCKROACH COLLECTION.

a. General.

(1) Cockroaches are most active in the dark. They are not usually seen in large numbers during the day unless the infestation is extremely heavy. Since they must have a constant source of water and food, they are most likely to occur in areas where food is stored, processed or served, such as mess halls, snack bars, commissaries and living quarters. The areas under sinks and tables, the interiors of cabinets and drawers, and meat cutting rooms are excellent cockroach harborages. Dishwashing areas, utility closets and soft drink dispensers are also productive collecting sites. Crawl spaces beneath buildings are often overlooked, but can be heavily infested.

(2) The German cockroach is the most frequently encountered species in food preparation and serving areas. American cockroaches are usually found in basements, sewer lines or boiler plants, and are usually less common in food service facilities than the German cockroach. The Australian

cockroach is similar to the American cockroach in habitat as well as appearance, except that it is not commonly seen in sewers. The Oriental cockroach prefers slightly cooler areas, and is often found in basements and cellars, crawl spaces, utility closets and latrines. The brown-banded cockroach is a small species that spreads throughout infested premises and is often found in furniture and cupboards.

b. Methods.

(1) Collection by Hand. If cockroaches cannot be readily observed during the day, conduct the search at night in areas where lights have been extinguished for at least 30 minutes. Keep the lights off during the search; use a flashlight for illumination; use a l-quart to l-gallon container, such as a mayonnaise jar, to hold the captured cockroaches. Grease the top inch or two of the inside wall of the jar with a light, even coating of petrolatum mixed 1:1 with mineral oil to prevent their escape. Capture the cockroaches by placing a small beaker, jar or paper cup over them and slipping a thin card under the container opening. Transfer the cockroaches to the holding jar. An alternative method is to use the card to flip cockroaches into a manilla envelope for subsequent transfer to the holding jar.

(2) Flushing Agents. Flushing agents such as pyrethrins or dichlorvos will increase cockroach activity and drive many individuals from their harborage in a short time. The standard issue aerosol insecticide spray containing pyrethrum is an effective flushing agent; however, pyrethrum is being replaced by synthetic pyrethroids in the newer aerosol cans and they are not as useful in flushing. Use of flushing agents to collect cockroaches for resistance testing is not recommended because the chemical may be lethal if the spray is not carefully controlled; if the survivors are then collected for testing, the test results could be biased.

(3) Unbaited Traps. While most unbaited traps such as sticky traps and electrocution devices are designed to kill the captured insects, there are traps which can be used with or without bait and are designed to keep the captured cockroaches alive. One of these is the Roatel®, a reusable plastic trap with hinged flaps through which cockroaches enter but cannot escape. The Roatel and other traps that can be used without bait attract the insects by presenting an area of harborage. Even the simple quart jar trap can be used without bait if the exterior is covered or painted to provide a darkened area of harborage. However, bait will enhance the attractiveness of the traps and should be used whenever possible.

® Roatel is a registered trademark of Fumakilla Limited, Tokyo, Japan.

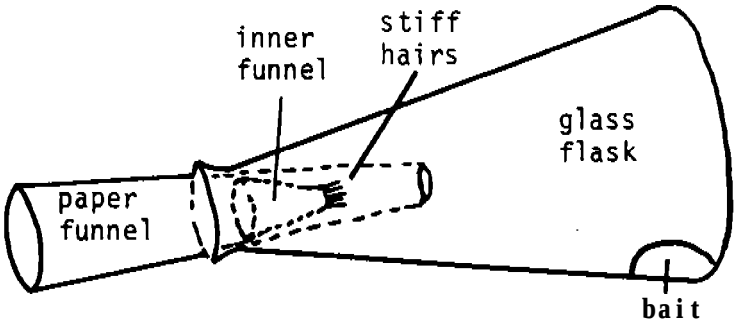
(4) Baited Traps. The jar trap is probably the most commonly used device for collecting cockroaches. If the jars are placed in a normal upright position, coat the necks of the jars with a 1:1 petrolatum and mineral oil mixture to prevent escape. Covering the exterior of the jar with a paper towel or similar material will provide better footing for cockroaches entering the trap. The jar may also be inverted or placed as shown in Figure 1, but then it must have a screen or paper cone with a 4-7 mm opening at the apex; the cone is inserted into the jar and the base is fitted to the neck of the jar. The size of the jar can be varied without much loss of collection efficiency; jars ranging from 2-gallon capacity down to baby food jars have been used with success. An Erlenmeyer flask is used for the Graham trap. Almost any food substance can be used as bait. White bread, a banana slice or peel, dog food (plain or soaked in beer), peanut butter, and CSMA fly rearing media, have been used with success. The Roatel trap is usually supplied with a packet of powdered bait which is placed in the center of the trap base. Bait with a high moisture content is advisable if the habitat is extremely dry.

(5) Supplemental Attractants. The existence of an aggregation pheromone in cockroaches has been demonstrated; therefore, traps that have an odor of cockroaches in addition to food bait may prove very successful. If cockroach rearing harborage or debris is available, a small amount placed in a trap may enhance its effectiveness. Some collectors prefer to bait the trap with a few live cockroaches in addition to the food bait. Crumpled paper towel or cardboard strips are often added to a baited trap to provide harborage for the captured cockroaches and thus reduce escapes.

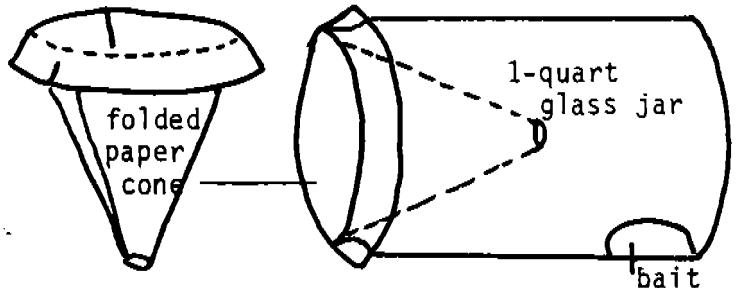
(6) Trap Placement. Traps should be placed in the areas within a facility where cockroaches are most active. A thorough inspection of the premises prior to trapping will help pinpoint the precise locations. Traps should be placed in dark areas along walls or in corners, as near to sources of food, water and harborage as possible. Traps placed just a few inches away from the proper location may catch significantly fewer cockroaches. If trapping is only slightly successful after one night, it is suggested that the traps be repositioned until more suitable locations are found.

(7) Suction Methods. Small portable vacuum cleaners are very useful as a quick method to capture cockroaches, especially at night when cockroaches are most active. Vacuum cleaners can be modified for collecting cockroaches by adding a collection container near the leading end of the hose to divert the collected specimens -away from the full force of the airflow and thereby reduce desiccation. Additional vacuuming hose, a backstrap and a crevice tool attachment may facilitate collecting. A long extension cord will also be helpful if the vacuum cleaner does not have a rechargeable power pack. With a little practice, a very large number of cockroaches can be collected in a short time with this method. Empty the collection container frequently. First instar nymphs are more susceptible to desiccation than other stages and are not usually collected successfully in large numbers by vacuuming.

(8) Supplies. See Tables 1 and 2 for cockroach collecting supplies and equipment.



a. The Graham Trap.



b. Standard Jar Trap.

Figure 1, Two Types of Cockroach Jar Traps,

TABLE 1. COCKROACH COLLECTING SUPPLIES

Jars, 1 quart, for trapping
Roatel traps
Sticky traps for preliminary surveys
Bait packets, for sticky traps and Roatel
Bait, food (e.g., dog food, lab chow, etc.)
Vacuum cleaner, with collecting container
Extra hose, bags, and crevice tool for vacuum
Extension cord
Flashlight and/or head lanterns
Containers, 1 or 2 gallon, for consolidating specimens (e.g., cockroach rearing jars)
Petrolatum mixture
Vials
Cotton balls and water containers for collected specimens
Mailing containers and labels, US Department of Agriculture (USDA) shipping permits
Collection data sheets
Tape, labels, pencils, scissors, etc.
Paper towels for temporary harborage

TABLE 2. VACUUM CLEANERS FOR COCKROACH COLLECTING

1. Black and Decker MOD 4® Cordless Portable Vacuum, with rechargeable energy pak and 16-hour recharger, No. 9321. About $35.00 from local distributors.

Accessories available:

Black and Decker No,	89-079	Energy Pak
	86-001	16-hour Recharger
	86-507	3-5 Hour Recharger
	76-699	Accessory Assortment, including Crevice Tool, Brush and Flexible Adapter
	76-670	Reuseable Filter Bags

2. Sears, Model 2086090, Sears Finest, Portable Hand Vac, 1.0 HP (peak), 4 foot vinyl hose, all-purpose nozzle, 18 foot cord, reusable cloth bag, 110-120 volts, 60 Hz AC $46.95 Cat. No. 20 K 6090

3. Sears, Model 20861151, Portable Hand Vac, 30-inch vinyl hose, upholstery nozzle, 18-foot cord, 110-120 volts, 60 Hz AC, with 2 disposable dust bags $29.95 Cat. No. 20 K 6115

4. Attachment Set for Sears Hand Vacs (Items 2 and 3 above), with 2 plastic wands, floor *nozzle,* crevice tool and brush $9.00 Cat. No. 20 K 6117

5. Bags, Replacement, Disposable, for Item 3 above, 3 per package $1.29/PK Sears Cat. No. 20 K 5021

® Black and Decker MUD 4 is a registered tradename of Black and Decker Manufacturing Co., Towson, MD.

6. HOUSE-FLY COLLECTING.

a. General. House flies are usually found during the summer and autumn around refuse disposal sites, food service facilities, stables, landfills, or other areas where food or decaying organic materials are present. Because house flies physically resemble, and are often found in association with, other species of nuisance flies, preliminary surveys should be made to ascertain the species present and the extent of the population before collections for resistance testing are initiated.

b. Collecting Eggs, Larvae, and Pupae. House fly eggs are laid in moist organic matter such as garbage piles, manure and feces, food waste or residues in garbage cans or dumpsters, etc. The cream colored larvae feed on these materials, usually burrowing up to several inches below the surface. When ready to pupate they migrate to drier areas at the edge of the pile. When heavy infestations are present, it is possible to collect many thousands of larvae simply by transferring them with the substrate into collecting jars. Eggs and pupae are more difficult to see in nature. Eggs can be collected by placing containers of fermenting CSMA fly larvae medium or other attractant in areas where adult house flies are numerous. Eggs of other species of filth flies may also be laid in the CSMA. Pupae can be collected by hand to supplement collections of other fly life stages.

c. Collecting Adult House Flies. Adult flies are easily collected by hand with a standard insect sweep net. They are then transferred into a small screen cage or a jar with a stockinet-sleeve attached. Several types of fly traps, such as the one shown in Figure 2, are available commercially or can easily be constructed. A bait such as fermented CSMA, rotting fruits or vegetables, or other organic waste is placed in a petri dish under the trap. After feeding or depositing eggs on the bait, the flies move upward toward the light and enter the trap through a small opening at the top of the cone. Since they do not generally- fly downward to escape,-and since the cone opening is difficult to find, few escape. Traps are not as reliable as netting because the fly attractants in the environment are often stronger than the bait presented at the trap. Collected flies should be transferred to a holding cage supplied with water-soaked cotton and adult fly diet (6 parts dry milk, 6 parts sugar, 1 part powdered egg yolk). It may be worthwile to attempt to egg the caged flies by placing a dish of fermented CSMA sprinkled with a few drops of dilute ammonium hydroxide in the cage. If eggs are produced, place them on additional moist CSMA for shipping.

d. Supplies. See Table 3 for house fly-collecting supplies.

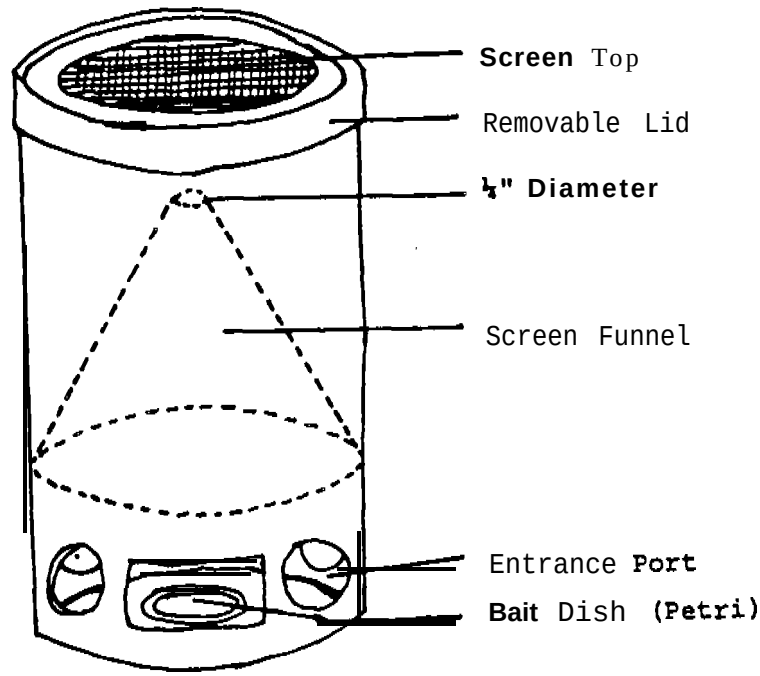


Figure 2, Fly Trap

TABLE 3. HOUSE-FLY COLLECTING SUPPLIES

Sweep nets
Fly traps
Cage(s) for adult flies
Adult fly diet (dry milk, sugar, dry egg yolk, 6:6:1)
CSMA fly larvae medium
Ammonium hydroxide, dilute
Paper cups, for food, water, and egging dishes
Cotton, for water cups and vials
Plastic vials, for water during shipment
Plastic jars, 1-quart to 2-gallon, for shipping eggs and larvae
Screen or stockinet cloth, to cover jars
Sponges or sphagnum moss, for moisture in adult shipping containers
Pill boxes, vials, etc., for shipping pupae
Forceps, scissors, tape, pencils, etc.
Collection data forms
Mailing tubes or cartons, labels, USDA shipping permits

7. MOSQUITO COLLECTING.

a. Collecting Eggs.

(1) Mosquitoes of the genera Culex and Culiseta deposit their eggs in rafts of up to 50 or more. The rafts remain afloat on the water surface until hatching occurs some 2 or 3 days later. They breed prolifically in rain barrels, tanks, cans and other types of artificial containers, especially where water is high in organic content. Egg rafts are easily collected from the surface of the water by slipping a small piece of screen or nylon netting under them and lifting. Place them in a container in water from which they were collected or in deionized water; tap water may have a high enough content of chlorine or fluorine to kill the newly hatched larvae.

(2) The genera Aedes, Psorophora and Anopheles lay their eggs Singly; the former two on the ground or just above the waterline, and the latter on the -surface of the water. Container-breeding species such as Aedes aegypti and Aedes triseriatus will lay their eggs in oviposition traps, or ovitraps. Ovitraps are constructed by painting the outside of a jar or can a shiny black. A 12-ounce beer can with the top removed works well. The container should be lined with a black cloth sleeve; a vertical strip of hardboard clipped to the side of the container is also suitable for egg

deposition. The ovitrap should be one-half'to two-thirds full of water with a little organic debris added. The traps should be examined and the liner replaced at least weekly.

b. Collectins Larvae.

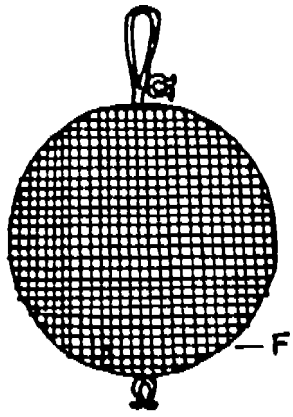
(1) Mosquito larvae are found in all types of aquatic habitats from warm, brackish seaside marshes to pure, cold, snow-melt water. In addition to rivers, lakes, ponds, and woodland pools, they are found in ditches, crab holes, pitcher plants, bottles, cans, tree and rock holes, old tires, etc. Prior to collecting larvae for resistance testing, the species in which resistance is suspected should be determined and its habitats and life cycle reviewed. Preliminary surveys should be conducted to locate its breeding sites. Samples should be taken and larvae preserved in alcohol for identification. In may cases, several genera and species will be found together in the same habitat; these collection sites should be avoided if others can be found containing relatively pure cultures of the species of interest. This will save considerable time and effort of sorting the mosquitoes during testing.

(2) If onsite testing is to be conducted immediately and specimens are plentiful, then third and early fourth instar larvae should be selected, if possible. If the larvae are to be shipped to the laboratory for testing, then second instar are preferred.

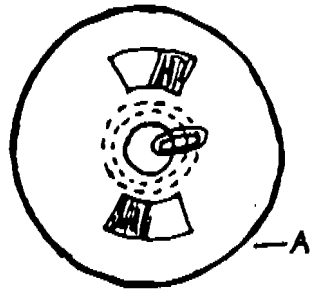
(3) Larvae are collected using white enamel dippers equipped with extension handles. Container-breeding species can be emptied into a collection vessel. A turkey baster or other large suction tube works well for treehole mosquitoes. Larvae can be emptied into white enamel pans for preliminary identification. A concentrator is used to separate specimens from debris and reduce the volume of water collected. Two types of concentrators are available, the automatic device for collection of aquatic specimens (ADCAS) shown in Figure 3, and the US Army Medical Bioengineering Research and Development Laboratory (USAMBRDL) concentrator (reference 6, Appendix). The concentrated larvae are then placed in containers for transport to the test site, or can be packed for shipment. While in the field, insure that the temporary containers have sufficient air space and water surface for the mosquitoes to breathe, and keep them out of sunlight to prevent overheating.

C. Collecting Pupae. Pupae do not survive shipment well, and should be collected only if they can be hand-carried to the laboratory in a short time. If eggs and larvae are difficult to collect and additional specimens are needed, then pupae may be collected, allowed to emerge, and then shipped as adults.

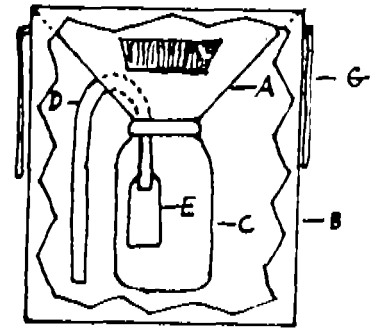
d. Supplies. See Table 4 for mosquito collecting supplies.



Coarse Strainer



Top View of Funnel



Cut-Away View of ADCAS

The ADCAS is constructed of a metal funnel (A), whose larger diameter of 6 inches is soldered into the top of a metal cylinder (B) 7 inches in height and whose smaller diameter of 1 inch is soldered to the metal bottle cap from a 120-cc aureomycin bottle (C). Two rectangular openings, 1 by 2 1/4 inches, are made in the side of the funnel and covered with 96-mesh, stainless-steel cloth soldered into place. A circular opening of 7/16-inch diameter is also made in the side of the funnel to accommodate the copper tube siphon (D) which is soldered into place at this junction. A detachable strainer (E) is mounted on the intake end of the siphon and consists of a stainless-steel cloth cylinder "of 9/16-inch diameter which has its open end soldered to the bronze collar and which is protected by four bronze wire guards soldered into place. The bronze collar is tapped to accommodate the threaded intake end of the siphon. Supporting ends of the 2/16-inch diameter metal bail (G) are inserted near the upper end of the metal cylinder (B). A coarse strainer (F) 6 1/2-inch in diameter is provided for the larger opening of the funnel (A) and is made from 8-mesh galvanized hardware cloth soldered between two supporting metal rings, one ring of which is prolonged and bent to form a handle. Bronze wire keepers are soldered to the coarse strainer for ease of attachment and detachment.

Figure 3. ADCAS Larval Mosquito Concentrator

TABLE 4. MOSQUITO COLLECTING SUPPLIES

Dippers and extension handles
White enamel pans
ADCAS or USAMBRDL concentrator
Vials, some with alcohol for preserving specimens
Screen or nylon net, small piece for picking pupae and egg rafts
Containers for holding and shipping larvae - plastic collapsible containers, plastic bags or jars
Medicine droppers
Ovitraps
Siphon devices (e.g., turkey baster)
Screened cages and shipping boxes for adults
Insulated shipping boxes for larvae
Collection data forms
Tape, scissors, mailing labels, pencils, etc.
Parafilm for sealing vials and containers
Sponges, sphagnum moss or cotton, for moisture in adult shipping containers
Sugar solution, vials and cotton for adult food
Boots or waders
Mosquito keys for onsite identification

8. PACKING AND SHIPPING SPECIMENS.

a. Shipping Permits,.

(1) US Department of Agriculture shipping permits may be obtained through the USAEHA laboratory to which the specimens will be sent. Those laboratories receiving specimens should procure their own supply of permits by following the procedures given in paragraphs (2) thru (5) below.

(2) The USDA, Animal and Plant Health Inspection Service issues shipping permits which authorize the interstate shipment of cockroaches, house flies, stored product pests and ticks. The issuance of permits is contingent upon the approval of the recipient State and the USDA. This approval must be obtained by each testing laboratory and renewed annually for each species to be shipped.

(3) Shipping permits may be obtained by sending an application form (PPQ Form 526 for cockroaches, house flies, and stored product pests and VS Form 16-3 for ticks) to the appropriate State agency for approval. This State agency will forward the application to the USDA Animal and Plant Health

Inspection Service following approval. Application forms and addresses of State officials are available from USAEHA-PMPMD (Pest Management and Pesticide Monitoring Division). Approximately 30 days are required for processing of the permit application.

(4) The Public Health Service does not require permits for interstate shipment of mosquito species indiginous to CONUS; however, approval for shipment should be obtained from the recipient State.

(5) The requirements for shipping permits for pest species not mentioned above may be obtained from USAEHA-PMPMD.

b. Cockroaches. Cockroaches may be successfully shipped in any stage of development. A mailing tube about 3 inches in diameter and 8 inches high with a cardboard coil insert makes a good shipping container. Specimens can be transferred to the tube by transferring their harborage or by pouring them through a funnel made from a manila folder; the upper edge of the funnel is greased with petrolatum. One-pint paper cups and glass or plastic jars with screened lids are also suitable if placed in a cardboard box with a generous amount of packing material. Food and moisture should be provided in the form of a carrot, apple, or potato slice. The food should be prevented from movement during shipping by wedging it between corrugated cardboard harborage coils or fastening it to the cover of the container. Shipments should be sent by priority mail at the beginning of a week to avoid weekend arrival. A USDA shipping permit must be attached to the outside of the container. The pesticide treatment history and all collection information should accompany the insects, either in the container or under separate cover. A collection data form is presented in Figure 4.

c. House Flies. House flies are most successfully shipped during the pupal stage. The pupae are shipped by placing them in a pill box, etc. Eggs and larvae should be shipped in fermented CSMA medium in a jar or other suitable container with screen or cloth secured to the mouth with a rubber band. Adults may be shipped in a container which has a screened opening in the lid. Inside the container, moist spagnum moss should be secured on the bottom with screen, or a vial with wick containing lo-percent sugar water or milk may be secured inside the container. A USDA shipping permit must be attached to the outside of the shipping container. The pesticide treatment history and all collection information must accompany the insects, either in the container or under separate cover.

RESISTANCE TESTING COLONY DATA		
INSTALLATION	**SPECIES**	DATE COLLECTED
COLLECTOR	LOCATION COLLECTED	METHOD OF COLLECTION
DATE SHIPPED	DATE ARRIVED	

PESTICIDE USE HISTORY

PRESENT (19)

1 YR. PREVIOUS (19)

2 YR. PREVIOUS (19)

3 YR. PREVIOUS (19)

4 YR. PREVIOUS (19)

5 YR. PREVIOUS (19)

REMARKS

HSE-RP Form 110, 1 Sep 80

Figure 4. Collection Data Form

d. Mosquitoes. The most successful stage of development for shipping depends on the genus of mosquitoes. Aedes mosquitoes are best shipped as eggs, but often larvae are the only stage collected. Culex and Culiseta can be shipped as eggs or larvae; Anopheles are best shipped as adults; therefore, shipping techniques for each stage are given below:

(1) Shipment of Eggs. Aedes egg papers should be placed in a plastic bag (or other suitable container) to prevent desiccation. Culex, Culiseta and Anopheles eggs should be placed between two pieces of filter paper which are, in turn, placed between two pieces of 1/8-inch thick foam rubber saturated with water. Several layers of filter paper or paper towel may be used as a substitute for the foam rubber. This unit is placed in a petri dish and sealed with tape. Anopheles eggs may also be shipped by placing the eggs in a jar or plastic bag with water. All eggs, except Aedes, should be surrounded with ice and/or refrigerated and shipped as soon as possible after collection.

(2) Shipment of Larvae. Second instar larvae, when possible, should be shipped. Anopheles larvae, however, should be third or fourth instar when shipped. Larvae of any instar may be successfully shipped; however, few of those that pupate inroute will survive, as pupae cannot be successfully shipped. Larvae should be placed in a jar or plastic bag with an equal amount of air space and dechlorinated water. The water should be clean with a small pellet of guinea pig or rabbit chow added. The larval container should be surround.ed with ice and/or refrigerated prior to shipment.

(3) Shipment of Adults. Adults will not normally be shipped for resistance testing. Specimens for adult testing should be shipped as larvae and allowed to emerge in the laboratory. If adult mosquitoes must be transported, a cardboard or Styrofoam container with a screen cover is suitable. A sponge moistened with 10 percent sugar solution should be wired to the screen or otherwise anchored within the container to provide food and increase the relative humidity. The sugar solution may also be contained in a vial with a cotton wick; the vial must be secured within the container. Moist sphagnum moss can be used to provide additional humidity.

e. Shipping Methods.

(1) Cockroaches and house fly-or mosquito eggs can be shipped by priority mail within the United States. Other species and life stages should be shipped by airfreight or through an overnight delivery service.

(2) Shipments should be made early in the week to avoid weekend arrival. Notify the recipient by telephone and be prepared to give the air bill number, airline, flight number, time of arrival at the airport, or other pertinent information.

(3) Addresses and telephone numbers of the USAEHA resistance testing laboratories are as follows:

Pest Management Branch (Bldg E-5800)
US Army Environmental Hygiene Agency
Aberdeen Proving Ground, MD 21010
AUTOVON: 584-3015/3792

Radiation and Entomological Sciences Branch
USAEHA Regional Division - South
Fort McPherson, GA 30330
AUTOVON: 588-2125

Radiation and Entomological Sciences Branch
USAEHA Regional Division - West
Fitzsimons Army Medical Center
Aurora, CO 80045
AUTOVON: 943-8090

Radiation and Entomological Sciences Branch
USAEHA Regional Division - North
Fort Meade, MD 20755
AUTOVON: 923-5281

(4) All mosquitoes should be sent to the Aberdeen Proving Ground (APG) laboratory. Cockroaches and house flies collected during USAEHA surveys should be sent to the appropriate regional division laboratory. Specimens collected at installations with a MEDDAC entomologist and/or collected during special studies should be sent to APG.

APPENDIX

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