



**United States Navy**  
**Shipboard Pest Management Manual**  
**NAVMED P-5052-26**

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# NAVMED P-5052-26

## United States Navy Shipboard Pest Management Manual

**28 Mar 2023**

To: Holders of the Manual of United States Navy Shipboard Pest Management

1. Purpose. This revision provides general public health and preventive medicine guidance for Department of the Navy (DON) personnel concerned with pest management and surveillance onboard U.S. naval vessels.
2. Background. This manual is applicable to all Navy medical shipboard assets. All U.S. Navy pest management activities must comply with Federal law.
3. Action. Replace entire NAVMED P 5052-26 with this version.



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Chief, Bureau of Medicine and Surgery  
Acting

Releasability and distribution:

This publication is cleared for public release and is available electronically only via the Navy Medicine Web site at, <https://www.med.navy.mil/Directives>

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SECTION I. OVERVIEW OF THE U.S. NAVY SHIPBOARD  
PEST MANAGEMENT PROGRAM

1-1. Purpose. This manual outlines Department of Defense (DoD), Office of the Chief of Naval Operations (OPNAV) and Bureau of Navy Medicine and Surgery (BUMED) policies and procedures; defines responsibilities; and provides detailed guidelines for the U.S. Navy Shipboard Pest Management Program. The information contained herein is the combined effort of Navy medical entomologists and preventive medicine technicians (PMT) to provide a comprehensive reference to assist personnel in conducting a safe, effective, and environmentally sound program utilizing the concepts of integrated pest control. Diligence in detecting potential problems and monitoring control measures is essential. However, controlling pests aboard naval vessels requires the cooperative effort of all hands in maintaining good sanitary standards in workspaces, berthing, and common use areas.

1-2. Responsibilities

1. The commanding officer of a Navy vessel must ensure a Senior Medical Department Representative (SMDR) and Hospital Corpsmen responsible for pest control are certified in shipboard pest management.
2. The SMDR ensures an ongoing shipboard pest control program is maintained. The main elements of an effective program are:
  - a. Maintaining an effective rodent exclusion program.
  - b. Prohibiting fumigation of ships' spaces and prohibiting commercial contracts for pest control services aboard ship, unless under the guidelines governed by the United States Coast Guard, 46 CFR part 147A.
  - c. Ensuring all pesticides (Appendix B), pest control equipment (Appendix C), and PPE (Appendix D) have been approved for use aboard naval vessels by BUMED. BUMED approves by using the Armed Forces Pest Management Board (AFPMB) approved pesticides list and OPNAVINST 6250.4C. A Navy medical entomologist must be contacted to receive approval for the procurement of non-standard stock pesticides.
  - d. Maintaining a control program for meal, ready-to-eat (MRE) rations, to prevent materiel loss from pest infestations.
  - e. Conducting pier side food acceptance inspections and shipboard pest surveillance (every 2 weeks, or more often if necessary, as part of food sanitation inspections) to identify the presence of any pest species, including source locations and severity of the infestations. Evaluating the effectiveness of control measures through follow-up post-treatment surveys.
  - f. Maintaining appropriate sanitation procedures to exclude or eliminate shipboard pests.

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g. Conducting and supervising safe pest control operations as outlined under current BUMED instructions, including:

(1) Coordinating with the respiratory protection officer and safety officer to ensure appropriate National Institute for Occupational Safety and Health (NIOSH) approved pesticide respirators are readily available for use (see section V, article 5-2).

(2) Ensuring all personnel who perform pest control operations are adequately trained in respiratory protection and respirator use, medically evaluated, and are receiving annual respirator fit-testing.

h. Maintaining safety data sheets (SDS) for all pesticides stored or used aboard ship.

i. Maintaining an ongoing pest control log that adequately documents pest control procedures and shipboard pest control training conducted aboard ship. Meeting mandated external reporting requirements, including documentation of pesticide use by submitting a DD Form 1532 available at [https://www.esd.whs.mil/Directives/forms/dd1500\\_1999/](https://www.esd.whs.mil/Directives/forms/dd1500_1999/) for archive at <https://www.acq.osd.mil/eie/afpmb/index.html>.

j. Maintaining a basic reference library of written regulations and program guidance. Vessels with no assigned medical department representative (MDR) may obtain technical consultation and assistance from their cognizant Navy and environmental preventive medicine unit (NAVENPVNTMEDU) or Navy Entomology Center of Excellence (NAVENTOCTR).

3. Responsible corpsmen must establish and maintain a safe and effective program for controlling insects, rodents, and other pests that may affect the health and well-being of ship's personnel, lead to loss of materiel, or affect the deployment status of vessels. Per OPNAVINST 6250.4C, all shipboard medical departments must have at least a SMDR and all corpsmen responsible for pest control certified as shipboard pest management specialists. If a PMT (NEC L12A, Legacy 8432) is assigned, that individual will serve as the pest control program manager. Seats for certification courses may be scheduled by contacting the nearest NAVENPVNTMEDU or NAVENTOCTR. Certification is valid for a 4-year period.

4. Navy medical entomologists assigned to NAVENTOCTR and NAVENPVNTMEDUs oversee the shipboard pest control program. This oversight is achieved by:

a. Providing guidance, on-site consultation, technical assistance, and recommendations to fleet commands on all matters relating to shipboard pest control.

b. Ensuring commands requesting pest control services have adequately prepared spaces for treatment with pesticides and ensuring the requesting command provides post-treatment clean up.

c. Conducting education and training of selected personnel for certification as shipboard pest control specialists, following procedures outlined in BUMEDINST 6250.12D.

d. Reviewing and evaluating all pest control procedures, pesticides, pesticide dispersal equipment, and new technologies before approval for shipboard use.

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1-3. Education and Training Requirements

Medical Department personnel responsible for pest control operations must be certified to conduct shipboard pest control operations by attending and successfully completing the Shipboard Pest Management Course (CIN: B-322-1075). Ship’s stewards or other personnel assigned pest management responsibilities on Military Sealift Command (MSC) ships may also attend the course and receive certification. U.S. Coast Guard personnel may attend the course and receive a certification of attendance to present to their certifying official in order to be certified for shipboard pest control operations.

Culinary specialists, watch captains, mess deck masters-at-arms, and break-out or cargo personnel not assigned to MSC ships may attend shipboard pest management training to increase their understanding of sanitation practices related to shipboard pest control, pest recognition, and proper preparation of spaces before and after pesticides are applied. A certificate of attendance can be issued but they will not be certified. Although these personnel will NOT receive certification, they may assist the MDR in applying pesticides when directly supervised by certified personnel.

1. Certification Training

a. Training consists of 1 day of classroom (didactic) instruction and ½ day of field aboard a ship or vessel; outline can be found in table 1-1.

b. Classroom training is conducted under the supervision of NAVENPVNTMEDU or NAVENTOCTR training department personnel. A written examination with a minimum passing score of at least 70 percent must be achieved.

2. Training Requirements

a. After ship’s personnel have completed the classroom portion of the course, the SMDR may schedule the field training directly with the course’s lead instructor or through the training department of NAVENTOCTR or the cognizant NAVENPVNT-MEDU. The requirement for field training aboard a vessel should be completed no later than 1 week after the classroom phase. A certificate of completion will not be issued until both phases of training are completed.

b. Training every 4 years is required to retain certification. Information on convening dates and quotas can be obtained by contacting training activities (Appendix E) or online through the Catalog of Navy Training Courses.

**Table 1-1. Outline of Shipboard Pest Management Training**

Subject	Hours
Course Introduction and Administrative Requirements	0.75
Program Responsibilities and Training	0.25
Biology, Surveillance and Control of:	
• Cockroaches	2.50
• Stored Products Insects	
• Rodents	
• Miscellaneous Shipboard Pests	
Quarantine Issues	1.00
Pesticides	
• Recording and Reporting Pesticide Use	
• Safety, Health and Personal Protective Equipment	2.50
• Pesticides and Pesticide Dispersal Equipment Use and Procurement	
Review and Examination	1.00
<b>Total Classroom Hours</b>	<b>8.00</b>



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SECTION II. SHIPBOARD PESTS

2-1. Introduction

1. Global presence and the increased operating tempo of naval forces greatly increase the chances of encountering pests that transmit pathogens, infest food supplies, or simply present a nuisance to crew members. This manual concentrates on the biology, surveillance, and control strategies of pests that are commonly found aboard ships.
2. These pests are prone to inhabit certain areas, making continual monitoring important for the spaces listed:
  - a. Food service areas
  - b. Sculleries
  - c. Mess decks
  - d. Ship's stores
  - e. Heads and showers
  - f. Dry provision storage areas
  - g. Berthing areas
  - h. Cleaning gear locker
  - i. Garbage collection areas

2-2. The German Cockroach

The German cockroach is the most commonly encountered pest aboard Navy ships. Cockroaches contaminate food and food preparation areas, and lower crew morale. The construction characteristics of naval vessels make cockroach control very challenging.

Standing water, food, warmth, and numerous harborages provide the cockroach with an ideal habitat for growth and survival. Their habits and body structure enable them to potentially transmit pathogens that cause dysentery.

Cockroach presence can indicate inadequate sanitary practices or ineffective control measures. Medical Department personnel must understand the biological characteristics of cockroaches, particularly the German cockroach, to implement an effective surveillance, prevention, and control program.

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1. **Biology.** The German cockroach (Fig. 2-1a, b, c) is a small, flattened, light brown insect of which adults can be easily identified from other cockroaches (Fig. 2-2) by the presence of two dark longitudinal stripes behind the head (Lieutenant's bars). Adult German cockroaches are approximately one-half inch long. Adult females produce a visible egg capsule (called an ootheca) located at the tip of the abdomen (Fig. 2-1b, d) and can produce 30-40 young cockroaches, called nymphs, per capsule. German cockroaches require food, water, warmth, and harborages for growth and survival. Their flattened bodies enable them to hide in tight places difficult to inspect. German cockroaches are nocturnal and gregarious in behavior, living together in harborages.



Fig. 2-1. German Cockroach. a=male; b=female; c=nymph; d=egg capsule

2. **Surveillance Procedures**

a. Per COMNAVSURFPAC/COMNAVSURFLANT 6000.1, pest inspections are required every 2 weeks, or weekly during an infestation, and are especially important because light infestations usually go unnoticed by ship's personnel. Surveillance for cockroach harborages is an essential part of a successful control program to identify and control a cockroach infestation (see appendix G for an example). Early identification of sites infested by cockroaches will expedite control by eliminating the breeding sources.

b. The presence of nymphs and adult cockroaches in the same harborages often indicates a well-established infestation. The shipboard pest control specialist should conduct a cockroach survey every 2 weeks in food service areas or weekly during infestation until cockroaches are no longer present.

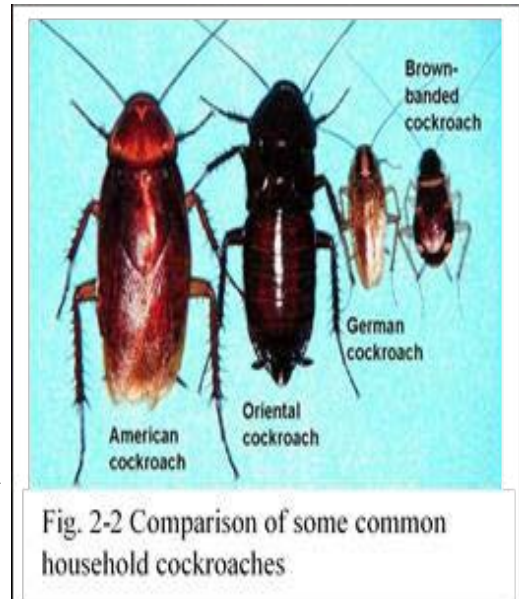


Fig. 2-2 Comparison of some common household cockroaches

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c. Infestations are most likely to be in and around:

- (1) Steam lines
- (2) Cable bundles
- (3) False bulkheads, overheads, and splash boards
- (4) Lagging
- (5) Behind pictures and bulletin boards
- (6) Around holes for plumbing and electrical lines
- (7) Behind drawers
- (8) Around counter and serving line supports
- (9) In hollow furniture and utility equipment legs
- (10) Oncoming food stores, soft drink containers, and cardboard containers
- (11) Ovens and oven hoods
- (12) Motor housings, esp. in refrigeration units, ice cream machines (Fig. 2-3)
- (13) Deck drains (Fig. 2-4)
- (14) Sinks and drains
- (15) Steam kettles
- (16) Behind stainless steel panels and ventilation grating
- (17) In expansion joints and under pipe insulation



Fig. 2-3 Ice cream machine



Fig. 2-4 Deck drain

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(18) Inside electrical switches, fuse boxes, and valve junction panels (Fig. 2-5)

(19) Unsecured debris (boxes and bags)

(20) The presence of cockroach frass (feces) is a good indication of an active or past cockroach infestation. Cockroach frass resembles coffee grounds or pepper and accumulates near harborages and infested containers (Fig. 2-6).

d. Specific inspection techniques are necessary to locate cockroach resting sites and harborages. The use of a mechanics mirror and a good flashlight is essential for a proper visual inspection in food preparation and service areas.

e. When conducting a German cockroach inspection in galley spaces, it is necessary to bend down and look under equipment and along bulkheads.

f. Inspecting food handling equipment may require that access plates to motor housings be removed as cockroaches will often be found among cooling coils, motor mounts, and edges of condensation pans. Have authorized personnel remove guards, grating, panel covers, and motor housing covers as necessary for inspection and treatment.

g. German cockroaches will often disperse when their harborage is disturbed. A vacuum may be useful when inspecting known harborages to collect cock roaches attempting to escape. After use, contents of the vacuum **MUST** be placed and sealed in a plastic bag and discarded from the ship to prevent spread of adults. If left onboard cockroaches can chew through the plastic and escape from the bag.

### 3. Flushing Agents

a. Flushing agents, such as contact insecticides (Appendix B) are useful in locating cockroaches and their harborages. Spray a small amount of flushing agent into potential harborages using the extender tip on the aerosol can. Flushing agents will produce a quick response, if cockroaches are present. Do not apply insecticides around bait stations or surfaces treated with insecticide dusts.

b. Use caution in areas with electrical or fire hazards and use the insecticide as per label instructions.



Fig. 2-5 Valve junction panel



Fig. 2-6 Cockroach frass

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4. Sticky Traps

- a. Sticky traps (Appendix B) are the most useful survey tools to detect low-level populations, locate harborages, and determine the effectiveness of treatment.
- b. Trapping is a surveillance tool only and will not reduce cockroach populations.
- c. Prior to utilizing sticky traps it is critical to develop a surveillance plan to both assess the size and location of the population prior to treatment and to determine the effectiveness of control measures employed. A written plan with locations documented will allow other additional technicians to survey in the same locations after turn-over (Appendix G).
- d. Place traps near suspected harborages and allow them to remain in place for 24 hours. Place traps in the same locations each time. For best results, place them flush on the deck in dark areas along bulkheads or in corners and use a map of the surveyed spaces to record their locations. The more traps you use in a given space, the better you will be able to pinpoint harborages.
- e. In spaces that are often wet, such as sculleries, it is useful to place traps on bulkheads several inches off the deck, thereby protecting them from water. This can be done by placing tape on the bottom of the trap and affixing it to the bulkhead.
- f. Count the trapped cockroaches and record the results in your pest control log.
- g. If two or more cockroaches per trap are caught during the 24-hour period, pesticide treatment should be utilized. Live cockroaches in the traps should be killed and disposed of.

5. Prevention

- a. Conduct random pier side acceptance inspections when stores are coming aboard to prevent the infestation of cockroaches. This is a critical element of the shipboard pest control.
- b. For cockroaches, pay particular attention to fresh foods, baked goods, and corrugated cardboard or poorly-sealed, single ply cardboard containers. Flushing agents are particularly useful for pier side and underway receipt inspections. When used with an extender tip, they can be applied to the corrugations in cardboard packaging, a common hiding spot for cockroaches. If a vast amount of goods is being loaded, inspect as much representative material as practical ensuring a representative sample for each product is inspected. Though it is not feasible to conduct inspections during an underway replenishment evolution, inspect oncoming goods before they go into onboard storage.
- c. Preventive control strategies can reduce large populations or eliminate many small cockroach infestations. Use preventive control measures on a continuous basis even in the absence of a cockroach infestation.

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d. A high level of sanitation is the first step to effective cockroach control. Routine application of pesticide is NOT a preventive measure and is NOT authorized.

e. The four key factors that support cockroach infestations are food, water, warmth, and harborages.

6. Food

a. Cockroaches can exist on limited quantities of food. Strict adherence to the guidelines listed will limit cockroach populations:

(1) Store food and garbage in containers with tight-fitting lids to prevent access to foraging cockroaches.

(2) Clean food preparation areas, equipment, and eating utensils thoroughly after each meal.

(3) Clean food spills immediately.

(4) Prohibit food consumption in berthing areas.

(5) Limit accumulation of organic material, especially in deck drains and trash rooms.

b. Trapping is a surveillance tool only and will not reduce cockroach populations.

c. Prior to utilizing sticky traps it is critical to develop a surveillance plan to both assess the size and location of the population prior to treatment and to determine the effectiveness of control measures employed. A written plan with locations documented will allow other additional technicians to survey in the same locations after turn-over (Appendix G).

d. Place traps near suspected harborages and allow them to remain in place for 24 hours. Place traps in the same locations each time. For best results, place them flush on the deck in dark areas along bulkheads or in corners and use a map of the surveyed spaces to record their locations. The more traps you use in a given space, the better you will be able to pinpoint harborages.

e. In spaces that are often wet, such as sculleries, it is useful to place traps on bulkheads several inches off the deck, thereby protecting them from water. This can be done by placing tape on the bottom of the trap and affixing it to the bulkhead.

f. Count the trapped cockroaches and record the results in your pest control log.

g. If two or more cockroaches per trap are caught during the 24-hour period, pesticide treatment should be utilized. Kill and dispose of live cockroaches in the traps.

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7. Water. German cockroaches require a readily available source of water. Preventing access to water will adversely affect reproduction and survivability. To accomplish this:
- a. Repair water leaks
  - b. Store wet swabs with the head up
  - c. Repair clogged drains
  - d. Eliminate all standing water
8. Warmth. Cockroaches can be found in and around warm, sheltered areas. Food packages such as baked goods, bags of potatoes or onions, and other containers with signs of cockroach infestation can be placed in a freezer to kill the cockroaches. Cockroaches will be killed in 48 to 72 hours at freezer temperatures (0°F).
9. Harborages. German cockroaches prefer very small cracks and crevices for resting and hiding. All cracks and crevices should be suspected as harborage areas. Cockroach populations will be severely stressed if harborages are reduced or eliminated.
- a. Seal cracks and crevices with a caulking compound only when you can be sure the harborage can be sealed completely. Incompletely sealing the void provides a "safe zone" that allows cockroaches in and out while restricting access for inspection and treatment.
  - b. Coordinate with engineering department personnel to repair or remove damaged or deteriorating lagging.
  - c. Recommend the culinary staff promptly remove cardboard and cardboard boxes from food service areas.
  - d. Prohibit the use of shelf liners.
  - e. Coordinate with engineering department personnel to eliminate false overheads and bulkheads, if possible.
  - f. Coordinate with engineering department personnel to eliminate unnecessary metal coverings or flashing.

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2-3. Cockroach Control Aboard Surface Ships. Proper sanitation is a key element in managing cockroach infestations on ships. Without sanitation, all attempted pest control measures will fail to eliminate the cockroach population. The preferred method of shipboard cockroach control incorporates surveillance with an aggressive baiting program in conjunction with Insect Growth Regulators (IGR).

1. Cockroach Bait. Cockroach baits (Fig. 2-7) are available as both bait stations and gel formulations (Appendix B). Bait stations contain a small amount of bait enclosed in a plastic housing. Use gel baits according to directions on label. Bait placements must be monitored for feeding and reapplications made as necessary. Baiting is more effective than contact insecticides due to the domino effect of bait being carried back to the nesting area to kill other cockroaches.

a. When placing cockroach baits, follow these recommendations:

(1) Place baits where cockroaches or their droppings have been detected. Concentrate efforts on high-density areas as indicated by surveillance. Baits may be placed behind equipment, inside fuse boxes, the underside of tables, in overheads, inside torn or damaged lagging, and in enclosed motor areas (Fig. 2-8).

(2) If feasible, bait stations should be placed horizontally flush to the deck with the label side against the surface. Vertical placement can reduce the likelihood that cockroaches will enter the bait station.

(3) Map placement locations to aid in finding and replacing stations (Appendix G).

(4) Check a representative sample of baits periodically (10 percent, every 3-7 days). High heat or high moisture conditions can cause the bait to dry and crack or soften and run. Under these conditions, it may be necessary to replace bait more frequently. Continue to apply bait as indicated by surveillance.

(5) Do not place bait or bait stations in wet areas. When exposed to liquids, baits will rapidly degrade and become unattractive to cockroaches.

(6) Placing baits as close to harborages as possible increases their effectiveness.



Fig. 2-7. Adult German cockroach feeding on gel bait



Fig. 2-8. Navy PMT inspecting galley for presence of cockroaches for bait placement. Top image shows cockroaches in harborage immediately after opening an electrical box.



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b. Cockroach baits do not show immediate effects once ingested. It may take 1-2 weeks to see a noticeable decrease in cockroach numbers. The baits also remain active in the bodies of dead cockroaches and can deliver a lethal dose to cockroaches that feed on the dead cockroaches.

c. Baits must never be stored with other pesticides as exposure to other pesticides will render baits ineffective.

d. Do not spray residual insecticides or flushing agents on or near baits.

2. Insect Growth Regulators (IGR). IGRs, such as Gentrol Point Source (NSN 6840-01-501-2905), should be used in conjunction with other cockroach treatments including baits. IGRs work by interfering with the normal growth and development of cockroaches, preventing them from reaching sexual maturity, and causing gravid females to abort their eggs.

3. Preparation of Spaces for Residual Insecticide Applications. When using insecticides, adhere to label directions. The “more is better” idea is not true regarding insecticides and will reduce the effectiveness of the insecticide and limit control.

a. Prior to treatment, prepare treatment spaces and food service areas before insecticide application to prevent accidental exposure to unintended areas.

b. Ensure departmental coordination in scheduling date and time of the treatment and materials and personnel needed for the treatment evolution.

c. Notify all individuals directly involved in preparing the space and all who have responsibility for the space. These personnel should include those listed:

- (1) Executive Officer
- (2) Food Service Officer
- (3) Department Head
- (4) Supply Officer
- (5) Master-At-Arms
- (6) Watch Captain
- (7) Engineering if tag outs are needed

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d. The checklist listed provides general guidance for preparing spaces, and may be modified depending on the type of vessel, insecticide to be used, and severity of the cockroach infestation:

(1) Conduct a complete field day, ensuring a thorough deep cleaning of all surfaces. Grease and dirt will reduce the effectiveness of the applied pesticide. Food service spaces must have all food contact surfaces covered before application. After the treatment is complete, thoroughly clean food contact and food preparation surfaces with soap and hot water before use.

(2) Do not allow exposed food or food utensils in treatment areas. Completely cover foods that cannot be removed with impervious material such as aluminum foil or waxed paper.

(3) Move all non-fixed equipment and furniture away from bulkheads to facilitate proper treatment.

(4) Have equipment with potential electric spark hazards tagged out.

(5) Ensure access panels to all power boxes, motor compartments, and the ventilation system are opened before beginning treatment. Only authorized personnel should open these access panels.

(6) Open spaces having false bulkheads or overhead panels to provide access for treatment.

(7) Post warning signs on all entrances to spaces under treatment.

4. Crack and Crevice Treatment. This technique involves the placement of insecticide into all existing and potential cockroach harborages. Crack and crevice treatment reduces the chance that the insecticide material will be washed away during routine cleaning procedures. Dust, liquid, and aerosol insecticide formulations can be used. Follow the label directions, direct the spray into all potential cockroach harborage.

5. Void Treatments

a. To access voids behind false bulkheads, an extender tip must first be attached to an aerosol can.

b. The extender tip is then inserted into the void through any existing hole in the bulkhead, deck, overhead area, or place where screws can be removed and replaced. Do not make new holes for placement of void treatments, unless authorized.

c. Dusts such as CimeXa™ (NSN 6840-01-679-5585) provide excellent long-term control when used for both crack and crevice and void treatments, provided the area treated is not subject to excessive moisture or free standing water. CimeXa™ may be used with water to apply as a brushable paste.

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6. Post-Treatment Procedures. After insecticide treatments have been completed, refer to the pesticide label for re-entry requirements. Prohibit re-entry of personnel into treated spaces until the space has been ventilated for at least ½ hour. It may be necessary to extend this time in poorly ventilated spaces or based on specific pesticide label requirements.

2-4. Cockroach Control Aboard Submarines

1. Pest Control. Pest control aboard submarines is similar to pest control aboard surface ships with regards to sanitation and prevention, but differs in pesticide use by specific guidance from COMSUBLANT/COMSUBPACINST 6000.2E.

2. Pesticides

a. Submarine tenders and other support activities will have adequate pest control equipment and appropriate insecticides available, with the exception of Combat bait stations, insecticides and pest control equipment must not be stored on submarines.

b. Read and closely adhere to pesticide label directions and precautions. Only when in port and able to ventilate outboard for at least 24 hours, can residual crack and crevice pesticide treatment be used. If a flushing agent is to be used aboard a submarine when in port and venting, take care to avoid contamination of baits or areas near baits. If in doubt, replace with fresh baits or bait stations before the submarine deploys.

c. Authorized bait stations are the only pest control device that may be used by the MDR while underway or pier side without venting. Sufficient quantities of this bait should be maintained to adequately control cockroaches in all food service areas; however, a maximum of 144 bait stations can be stored while underway. Approximately 4-6 bait stations are required per 100 square feet. Each bait station remains effective for approximately 3 months.

d. If any assistance is needed with pest infestations beyond the capability of the MDR, contact the cognizant NAVENPVNTMEDU or NAVENTOCTR entomologist for assistance. Entomologists should use caution when recommending residual pesticide applications and ensure the pesticide will not pose a danger after application (for example, off-gas dangerous products when exposed to heat or otherwise interfere with ventilation systems). Authorized residual pesticides may only be used by those certified in Category 8 Public Health Pesticide Applications and use the guidelines listed:

(1) Determine outboard ventilation time during and following treatment based on treatment conditions and the amount of pesticide used. The general rule is that the exhaust air should be discharged for at least 24 hours following application. This should be adequate for evacuating the propellant and pesticide odor.

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(2) Use residual pesticides only when the submarine is not expected to submerge for a period of 24 hours following application.

(3) Secure all equipment having flame or electrical spark hazards during treatment and for 24 hours after application.

(4) Prohibit re-entry of personnel into treated spaces until the space has been ventilated for at least ½ hour. It may be necessary to extend this time in poorly ventilated spaces or due to specific pesticide label requirements.

## 2-5. Stored Products Pests (SPP)

SPPs can cause considerable damage to stored subsistence. Losses are much greater than the amount actually consumed because food, contaminated by feces, odors, webbing, cast skins, and live or dead insects, may need to be discarded or destroyed, depending on the degree of contamination.

The most susceptible supply items to SPP are starchy products. Dry beans and peas, candy, spices, and dried fruit may also be susceptible to SPP infestation.

In addition to monetary losses, some species of SPPs can cause illness. Dermestid beetle larvae are covered with tiny hairs, which, if eaten, may cause serious intestinal distress. Some stored products pests, such as the Khapra beetle are internationally quarantined pests that can interfere with mission accomplishment.

### 1. Biology

a. The majority of SPPs are small, avoid light, and multiply rapidly under favorable conditions. Detection is difficult because the infestation often remains hidden inside packaging. Discovery is often delayed until insect populations are well established.

b. Adults and larvae are capable of penetrating both polyethylene and foil packaging. Thus, reduction of temperature and cold storage of susceptible or infested commodities are effective measures for the prevention and control of SPPs.

c. The more important SPPs that may be found aboard ship, are divided into two groups:

(1) Medically Important

(2) Non-Medically Important

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2. Medically Important SPPs

a. Dermestid Beetles

(1) Dermestid beetles (Fig. 2-9) are medically important because hairs on the outside of the larvae can cause intestinal trauma. An adult female can produce approximately 100 eggs during her lifetime.

(2) Most dermestid beetles are common pests in warehouses throughout much of the world. The adults and larvae are capable of penetrating both polyethylene and foil packaging.



(a) Khapra Beetle

1. The Khapra beetle has become a quarantinable insect of medical importance worldwide.

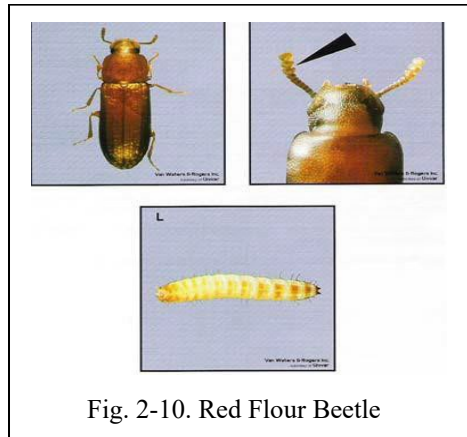
2. Adults and larvae are generally brown in color and covered with yellowish hairs. In contrast to other dermestid species, it feeds on grains and cereal products, instead of animal products.

3. Adult Khapra beetles may live a few days to several months. However, the larvae are especially resistant to starvation, and may live for several years without food. A small infestation can quickly develop into a large population and, unless completely eradicated from a ship, can continue to survive unnoticed in small numbers for long periods of time.

4. Because all dermestid larvae have external hairs, and because the Khapra beetle is difficult to distinguish from other dermestid species, any dermestid infestation must be handled aggressively. Every effort must be taken to ensure complete control and thorough destruction of the infested product. The presence of one or more living or dead larvae of Khapra beetle or other dermestid will be justification for condemnation of the lot (MIL-STD-904C).

(b) Flour Beetle

1. The red flour and confused flour beetles are very similar in appearance. Flour beetles appear as shiny, flattened, reddish-brown insects. The head and upper parts of the thorax are densely covered with minute pitting. The wing covers are ridged lengthwise. The terminal three antennal segments of the red flour beetle are distinctly larger than the other antennal segments (Fig. 2-10).



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2. In contrast, the antennal segments of the confused flour beetle gradually increase in size throughout their length, similar to the shape of a baseball bat (Fig. 2-11).

3. Both species are common pests of crackers, cereals, flour, and other grain products. While adults of the red flour beetle can fly, the confused flour beetle does not. Neither are good package penetrators, usually relying on existing openings.

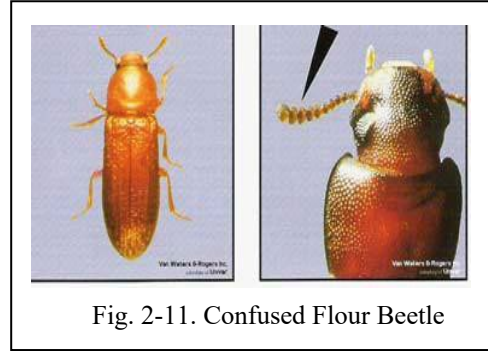


Fig. 2-11. Confused Flour Beetle

4. When present in large numbers, both species cause flour to turn gray in color. Adult flour beetles also secrete benzoquinones, which impart a disagreeable taste and odor to infested products.

5. The reported toxic and carcinogenic effects of the benzoquinones and possible levels in stored foods indicate a potential hazard. Because of this, a tolerance level of only three or more insects per pound of flour beetle infestations is lower than the limit of seven or more insects per pound for most other insects (MIL-STD-904C).

6. The female flour beetle lays an average of 440 eggs in her lifetime. Each egg is covered with a sticky secretion that allows the egg to adhere easily and securely to the seams of sacks and boxes. The adult may live 2-3 years.

### 3. Non-Medically Important SPPs

#### a. Saw-Toothed Grain Beetle

(1) The saw-toothed grain beetle (Fig. 2-12) is the most common SPP aboard ship. It can infest a wide range of commodities including grain products, dried fruits, candy, sugar, dried meats, and tobacco products. The adult is slender, flat, and brown. It is easily recognized by the six saw-toothed like projections on each side of the thorax. The female can lay as many as 280 eggs during her lifetime. The adult usually lives 6 to 10 months, but some may live for up to 3 years.



Fig. 2-12 Saw-Toothed Grain Beetle

(2) The merchant grain beetle is nearly identical in appearance, similar in habit, but more abundant in the Pacific region. Both are poor package penetrators, normally utilizing breaks along seams, vent holes, or other openings.

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b. Rice Weevil

(1) The rice weevil is considered to be one of the most destructive of the stored products pests, feeding on a variety of raw grains and grain products.

(2) Adults are reddish-brown and have a long “beak” or “snout” that extends out from the head and may be as long as  $\frac{1}{4}$  the length of the body (Fig. 2-13). The adult can be easily recognized by the presence of two yellowish or reddish spots on the top of each front wing.

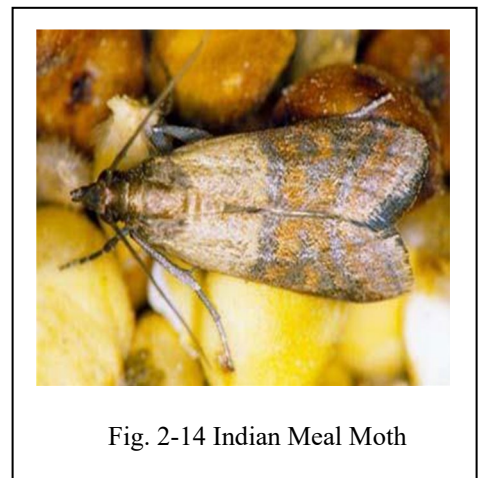


c. Indian Meal Moth

(1) The Indian meal moth (Fig. 2-14) is distributed world-wide and is the number one pest of dried fruits in storage. It also infests other commodities, including grain products, nuts, powdered milk, candy, and pet food.

(2) It can be a problem, especially with packaged food items in vending machines and snack areas aboard ships.

(3) When infesting grain products, it prefers coarse flours and is commonly found in items such as cornmeal. The fully-grown larvae are large compared to other common SPPs (about  $\frac{1}{2}$  inch long).



(4) The most commonly seen “white worms” found in packaged dried fruits are nearly always the larvae of this moth. They also produce a noticeable silk webbing. The adults of this moth have a grayish band across the upper  $\frac{1}{3}$  of their reddish-bronze wings. The female moth lays from 100 to 300 eggs during her lifetime.

d. Cigarette Beetle. The cigarette beetle (Fig. 2-15) infests a wide variety of foods including grains, spices, herbs, dried meats, drugs, and pet food. The adults are very active and readily fly, increasing the risk to adjacent food stores. They are capable of penetrating both polyethylene and paper packaging. The adult is light-brown in color and appears rounded. The head is bent downward, giving the adult a hump-backed appearance. The last segments of the antennae are saw-like or triangular, and the hardened front wings are smooth in appearance.



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e. Drugstore Beetle

(1) The drugstore beetle (Fig. 2-16), similar to its close relative the cigarette beetle, is very active and will eat a wide variety of foods. In addition to food products, they can consume paper and wood and can be serious pests in books.

(2) They have little difficulty penetrating metal foil packaging. The adult is reddish-brown in color. In contrast to the cigarette beetle, the last three segments of the antennae are elongated and sausage-like in shape. The front wings have parallel lines along their length. Its life history and habits resemble the cigarette beetle.

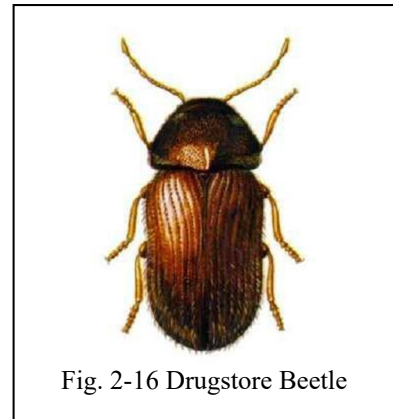


Fig. 2-16 Drugstore Beetle

f. Booklice. Booklice (Fig. 2-17) are minute insects about the size of a pinhead and are sometimes found covering stored food products (flour, cereals). These almost transparent insects are about 1 millimeter (mm) long. They feed on cereal products, vegetable and animal debris, paste, glue, and other organic substances. However, their preferred foods are molds and fungi. Each female lays up to 100 eggs, growing from egg to adult in about 3 weeks.

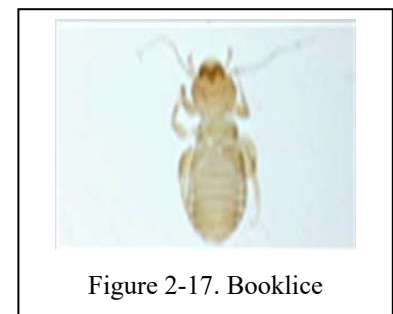


Figure 2-17. Booklice

g. A more comprehensive list of selected stored products pests that may be encountered aboard ship is found in Table 2-1.



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**Table 2-1. Characteristics of some stored products pests found aboard ships.** <sup>1</sup>

Processed grain products: flour, pasta, rice, grits, oatmeal, cornmeal, farina (cream of wheat), bakery mixes (cake, biscuit mixes), cookies, crackers, ice cream cones, (dry pet food is not commonly found aboard ship, but is a highly infestible item if on-loaded).

<sup>2</sup> Raw grains (unprocessed grain products): wheat, rice, corn, barley, oats, rye.

<sup>3</sup> Spices: red and black pepper, cinnamon, dry cocoa powder, dry chili spice mix.

Insect	Length of adult (mm)	Days to develop (egg to adult)	Adults can fly	Presence	Common type of product attacked <sup>1,2,3</sup>
Saw-Toothed Grain Beetle	2-3	30-50	No	Very common	Packaged cereals, crackers, dried fruits, candy, flour, meal, sugar, dried meat, tobacco, wide variety of grain products
Merchant Grain Beetle	2-3	30-50	Yes	Very common (Pacific region)	Oatmeal, rice, flour, cake mixes, macaroni, cookies
Cigarette Beetle	2-3	30-50	Yes	Very common	Tobacco, breakfast cereals, spices (esp., dry cocoa powder), raisins, rice, teas
Drugstore Beetle	2-3	60-210	Yes	Very common	Flour, oatmeal, spices, leather goods
Bean Weevil	2-3	20-90	Yes	Very common	Dried navy beans, kidney beans, peas, seeds
Pea Weevil and Cow Pea Weevil	3-5	20-90	Yes	Very common	Dried peas and other beans
Rice Weevil	2-4	30-50	Yes	Very common	Pasta, rice, raw grains, nuts, fruits
Red Flour Beetle	3-4	30-120	Yes	Very common (health concern, if three or more per pound)	Flour, other grain products, beans, peas, dried fruits, shelled nuts, spices, chocolate
Confused Flour Beetle	3-4	30-120	No	Very common (health concern, if three or more per pound)	Flour, other grain products, beans, peas, dried fruits, shelled nuts, spices, chocolate
Furniture Carpet Beetle	2-3	90-200	Yes	Common (health concern, dermestid species, if one or more larvae or lot)	Woolens, feathers, silk, animal fibers (hides with hair), natural bristles, products of animal origin
Common Carpet Beetle	3-5	80-200	Yes	Common (health concern, dermestid species, if one or more larvae or lot)	Woolen goods, rugs, upholstered furniture
Khapra Beetle	2-3	60-300+	Seldom	Rare (USA quarantine dermestid species, if one or more larvae or lot)	Raw grains, including wheat, barley, rice; dry milk products, breakfast cereals, dried fruits (a concern with products from SW Asia, Middle East, and North Africa regions)

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<b>Table 2-1 (Continued)</b>					
Characteristics of some stored products pests found aboard ships					
Insect	Length of adult (mm)	Days to develop (egg to adult)	Adults can fly	Presence	Common type of product attacked <sup>1,2,3</sup>
Varied Carpet Beetle	2-3	One generation per year	Yes	Common (health concern, dermestid species, if one or more larvae or lot)	Grain products, woolens, silks, feathers, products of animal origin, rodent nests, dead insects
Warehouse Beetle	2-3	40-60	Yes	Common (health concern, dermestid species, if one or more larvae or lot)	Grain products, dead insects
Lesser Grain Borer	2-3	30-60	Yes	Common	Flour and other raw grains, especially wheat, corn
Flat Grain Beetle	1-2	35-85	Yes	Rare	Broken raw grain, and other grain products, including flour
Spider beetles	2-3	90-300	No	Rare	Broken grain, seeds, dried fruits and meats, woolens and dried animal products, rat and mouse droppings
Indian Meal Moth	8-10	25-135	Yes	Very common (especially in vending machine areas)	Flour, corn, cornmeal, dried fruits, nuts, powdered milk, crackers, biscuits, chocolate, dried red peppers, dried flowers
Almond Moth	10-12	60-120	Yes	Common	Cereals, cocoa beans, dried fruits, flour, grain, peanuts, seeds, shelled nuts
Mediterranean Flour Moth	10-14	30-40	Yes	Rare	Flour, cereals, bran, biscuits, seeds, chocolate, dried fruits

**4. Surveillance Procedures for Stored Product Pests**

a. **Inspection and Surveillance.** A rigorous inspection and surveillance program will help prevent the introduction of infested commodities to storerooms and detect the presence of infested commodities before cross contamination can occur. Storage conditions and product history affect inspection frequencies. Increase inspection frequency to monthly or shorter if the events listed occurs:

- (1) Poor sanitation conducive to pest infestations
- (2) Any recent pest infestation or activity where products are used or store
- (3) Increased temperatures that can shorten insect development times

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b. Pier side and Onboard Inspections for SPPs

(1) Inspection of infestible commodities before on-loading is critical in preventing infestations of SPPs aboard ship. Conduct pier side inspections (Fig. 2-18) at time of receipt. Reject the product if evidence of an infestation is found. Conduct onboard inspections of all replenishments within 48 hours of receipt, including newly-acquired stored products transferred from supply ships (Fig. 2-19).

(2) Personnel performing receipt inspections can be medical or supply department members, but all must be trained in inspection procedures. Detailed inspection procedures are provided in MIL-STD-904C. Inspection sample sizes, based on the number of packages per primary container, are provided in Table 2-2.

(3) General inspection and surveillance procedures are as follows:

(a) Perform the receipt inspection with the aid of a flashlight.

(b) Examine packaging (e.g., individual boxes) for the presence of live or dead insect, cast "skins," or pinholes made when SPPs enter or exit the packaging.

(c) Examine seams and folds in packaging and the inside corners of cardboard boxes for signs of insect penetration or tears.

(d) Pay special attention to any items at or near the inspection test date (ITD). These items have a higher risk of infestation.

(e) The Jack-of-the-Dust, Cargo-King, or other personnel responsible for maintaining the storage space should conduct bi-weekly storage inspections. Medical department personnel should be immediately notified whenever live or dead insects are found.

(f) Medical Department personnel should inspect storerooms at least monthly, or more often as needed, to ensure the highest level of sanitation is maintained. SMDRs should recommend that all broken containers, torn sacks, and spilled food should be removed immediately. Decks should be swept and vacuumed, especially prior to receipt of new food stores.



Fig. 2-18 Conducting a pier side inspection

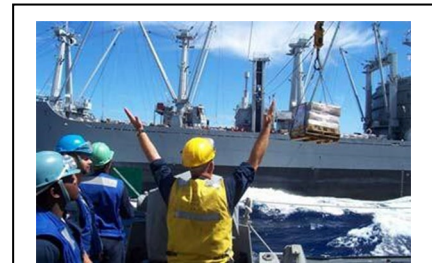


Fig. 2-19 Ship-to-ship unloading

Table 2-2. Recommended sample sizes to determine infestation levels of SPPs.

Lot size (Primary container)	Sample size
2 to 15	2
16 to 50	3
51 to 150	5
151 to 500	8
501 to 3,200	13
3,201 to 35,000	20
35,001 to 500,000	32
500,001 and over	50

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(g) Items most susceptible to infestation should receive priority during storeroom surveys particularly cereals, flour and rice.

(4) The items listed have the highest probability of infestation:

- (a) Grits
- (b) Cornmeal
- (c) Fry mix
- (d) Macaroni and Pasta
- (e) Barley
- (f) Cookie and cake mix
- (g) Flour
- (h) Dry beans and peas
- (i) Ready to eat cereal
- (j) Spices

(5) MIL-STD-904C lists the following thresholds for determining fitness for human consumption of commodities infested with SPPs. Products require disposal when the insects are found within (not external) inspected packages, as listed:

- (a) One or more dermestid larva(e), adult(s), or cast skin(s) per lot.
- (b) Three or more flour beetle larvae or adults per pound of product.
- (c) Seven or more of any other insects (larvae or adults) per pound of product.

c. Sanitation. Sanitation is extremely important in preventing infestations of SPPs. Infested items must be isolated or promptly disposed of to prevent contamination of other materials. A small amount of flour on the deck or accumulation of dust in cracks and crevices is enough to maintain a SPP infestation. Always keep storerooms clean. Adhere to the listed principles of storeroom sanitation at all times:

- (1) Clean up all spills immediately.
- (2) Dispose of items found in open or damaged packaging.

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(3) Vacuum deck grates and horizontal ledges.

(4) Rotate stock by date of pack, "first in, first out." Good stock rotation procedures are essential to minimize the potential spread of SPP infestation.

(5) If space permits, leave inspection aisles between commodities.

(6) Ensure decks are clean before receiving new stores.

(7) Do not over stack shelves. This may cause damage to product or prevent proper inspection.

d. Segregation of Infested Commodities

(1) When infested commodities are discovered in the storeroom, the listed procedures should be initiated:

(a) Segregate them from other subsistence and put them in cold storage.

(b) Items with an infestation below the levels specified in MIL-STD-904C can be placed in a freezer space for at least 3 days to kill most of the insects.

(c) Food material can then be sifted to remove the various insect stages, cast skins, and excrement.

(d) The food items should then be used as soon as possible.

(e) Freezing infested food materials for a minimum of 2 weeks at 0°F will kill all stages of insects.

(f) Dispose of items infested above the allowable levels.

(g) Isolate the products and expedite administrative procedures for disposal.

(2) All SPPs are temperature sensitive and low temperature arrests development and reduces survival. Low temperature storage will retard the development of infestations in food products. To the extent permitted by available space, keep all items at high risk of infestation in cold storage.

5. SPP Control Measures

a. Meals, Ready to Eat (MRE). Current pest control program guidance for MREs stored aboard ship is contained in the Armed Forces Pest Management Board (AFPMB) Technical Guide No. 38 is available at <http://www.acq.osd.mil/eie/afpmb/docs/techguides/tg38.pdf>.

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b. Fumigation aboard sea going vessels are governed by the U.S. Coast Guard regulation 46 CFR Part 147A. Due to procedural compliance, fumigations are not permitted for operational ships or submarines.

c. Insecticides can be used to control the spread of an existing infestation. All insecticides applied aboard ship to control SPPs require extreme caution to prevent contamination of food products. Residual insecticides are applied per label directions. If spot or area treatment is required, empty and clean the storeroom before applying the insecticide. If total removal of food products from the space is impractical, completely cover all food products with impervious materials. Consult NAVENTOCTR or a NAVENPVNTMEDU for the current recommendations on storeroom treatment.

d. Aerosols can be used to control flying stages of SPPs in storerooms when used as a space treatment following the label. Never spray aerosols directly on packaging. Insects inside packages will not be controlled by space treatment.

e. See section 4, Records and Reports, for information on submitting the DD Form 1222 in case of an infestation.

## 2-6. Rodents

1. Importance. Rodent control is extremely important to the Navy. Rodents may carry human disease such as plague, murine typhus, leptospirosis, and food-borne illnesses. Rodents eat, contaminate, or destroy enormous amounts of food annually. They may also create a safety hazard by gnawing on electrical insulation resulting in electrical shorts, outages, or fires.

2. Biology. A successful rodent control program must be based on understanding the behavior and habits of each species. Specifically, rodents:

a. Use a sense of touch when moving about, and prefer to run alongside vertical surfaces rather than across "open ground."

b. Have poor vision.

c. Have an excellent sense of smell, and are not repelled by human odors.

d. Have a good sense of taste, preferring fresh foods.

e. Have excellent hearing.

f. Are excellent climbers, jumpers, and swimmers.

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3. Rodents of Concern that can Infest Ships

a. Norway Rat

(1) The Norway rat, (Fig. 2-20) also called the “common rat,” “brown rat,” “water rat,” “wharf rat,” or “sewer rat,” is associated with diseases such as tularemia, spotted fever, and bubonic plague (by carrying fleas). It is a comparatively large rat, brown-gray above, gray on the underside, and weighs approximately 7 to 17 ounces. Its tail length of 5-8 inches is slightly less than half its total body length (12-18 inches, tip of nose to tip of tail). It has relatively small eyes.

(2) The Norway rat is present wherever human activity creates suitable harborage and there is an adequate food supply. It is an excellent swimmer and a good climber. It is found mainly in the holds and decks of ships.



Fig. 2-20 Norway Rat

b. Roof Rat

(1) The Roof rat, “ship rat,” or “black rat” (Fig. 2-21), was the reservoir for bubonic plague during the “Black Death” of the 14th century, which killed a third of Europe’s population.

(2) The Roof rat is an excellent climber and is often found in the overhead and upper decks of ships. It weighs 4-13 ounces, with its tail length (6-10 inches) greater than half its total body length (13-18 inches). There are many color and body type variations. Most are brown or gray above, and gray or white on the underside.

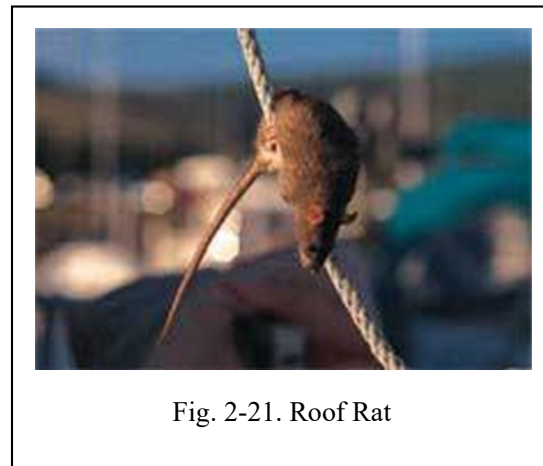


Fig. 2-21. Roof Rat

c. The House Mouse (Fig. 2-22) is a small rodent, adults weighing only about  $\frac{3}{4}$  ounce, with a total length of 5-8 inches. It is gray-brown above and below. It is commonly associated with humans and may cause serious damage to electrical wiring or food stores, especially sweets and grains.



Fig. 2-22 House Mouse

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4. Surveillance Procedures for Rodents

a. Surveillance helps to identify rodent infestations and is necessary to determine control measures.

b. The signs listed help determine location and degree of rodent infestation, the species involved, food and water sources, and needed improvements in exclusion and sanitation.

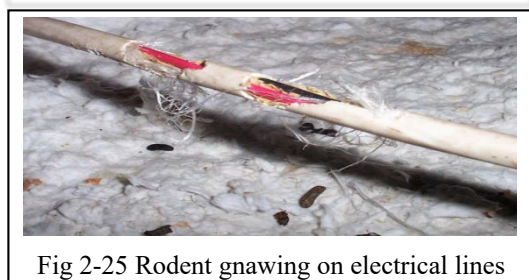
(1) Runways and Rub Marks

(a) Routes frequently traveled by rodents are called "runways" (Fig. 2-23). A dark color at the base of a bulkhead or where the rat climbs stanchions usually identifies the runways.

(b) This discoloration results from the repeated passage of rats. Since their hair is moderately oily, they leave behind a mark that continues to darken as more oils and dirt are rubbed off with repeated use of the runways.

(c) Runways are usually hidden from obvious view and may be anywhere. Because roof rats prefer to travel along overhead wires or steam lines, the most common runways will be found in those areas. Where the point of contact of the cross beams occurs, their rub marks would be evident. Other locations of runways may be the free edge of an angle iron, a pipe, an electric cable, or the top of sheathing.

(2) Rodents gnaw to gain entrance into containers and obtain food (Fig. 2-24), but will sometimes gnaw on wood and metal simply to keep their teeth worn down to a suitable length. Fresh gnaw marks are light in color with distinct teeth marks present. Gnawing on communication lines can interfere with operational mission and gnawing on electrical lines can create a force protection issue by making wires a fire hazard (Fig. 2-25).





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(3) Droppings

(a) Fresh fecal droppings appear soft, shiny, and dark (Fig. 2-26) and vary in shape and size, depending on the species (Table 2-3). After a few days, droppings may appear dry and hard.

(b) Old droppings appear dull and gray in color and easily crumble when pressed with a stick.

(c) Droppings are usually more abundant near the food source, but they may also be found along runways.

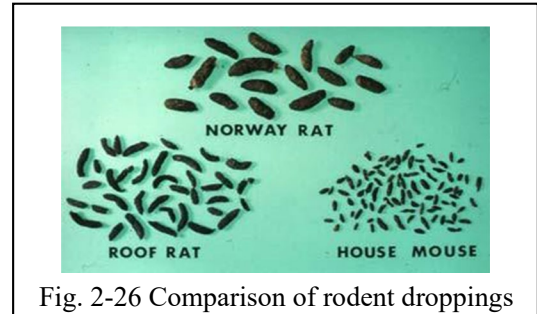


Fig. 2-26 Comparison of rodent droppings

(4) To search for rodent signs along runways, hold a black (UV) light at an angle to the deck. Fresh rodent urine fluoresces a lime green color. Old rodent urine appears bluish-white.

Table 2-3. Characteristics of rodent droppings		
Species	Shape	Length
Norway Rat	Blunt	3/4"
Roof Rat	Pointed	1/2"
House Mouse	Pointed	1/4"

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5. Prevention

a. The elimination of food and shelter by proper handling of food and prompt disposal of garbage reduces the attractiveness of the ship to rodents. Store garbage away from the ship if pier side. Sanitation is the cornerstone in successful rodent prevention and control programs.

b. Exclusion

(1) COMNAVSURFPAC/COMNAVSURFLANT Instruction 6000.1 dictates, in foreign ports and non-Navy controlled U.S. ports, all ships will employ properly fitted rat guards (Fig. 2-27) on all lines connecting the ship to the pier. The Medical Department will inspect to ensure compliance with the Manual of Preventive Medicine, NAVMED P-5010, Chapter 8.

(2) Rat guards should follow the American Society for Testing and Materials (ASTM) International standards F1099M, Standard Specification for Rat Guards, Ships (Metric). Three types allowable are:

(a) Type I - Multiple-line (doubling up), self-adjustable, accommodating the mooring line combinations.

(b) Type II - Single-line, self-adjustable, accommodating a single 5-mm wire to a 76-mm-diameter mooring line.

(c) Type III - Conical shape with tapered, slotted sleeve. Type III rat guards must be of the following sizes: (a) 75 mm, (b) 125 mm, and (c) 200 mm.

(3) Types I and II rat guards are designed to be installed from the deck or pier without a person physically coming in contact with the mooring lines or hawser, by lowering and positioning the guards away from the ship's hull with two ropes that are permanently attached as guide and tie ropes. Type III rat guards require a person to contact the mooring line to pull the two halves of the conical guard around the mooring line, wrap the slotted sleeves to the line, and physically close any opening between the mooring line and the circular opening at the center of the guard. The use of rat guards is further detailed in OPNAVINST 6210.2A and the Manual of Preventive Medicine, NAVMED P-5010, Chapter 8.

c. Since rodents are mostly nocturnal, lighting gangways and landing ramps at night can discourage rodents from coming onboard. Isolate gangways and other means of access to the vessel from the shore by a distance of at least 6 feet, unless guarded. Raise or remove cargo nets when not in use.



Fig. 2-27 Rat guard on hawser

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d. Inspect all incoming subsistence items for signs of rodent activity (e.g., droppings, urine, hair, gnawing, or live rodents).

e. Rodent Contamination. Contaminated units (boxes, cases, bags, bales) must be condemned under the conditions outlined:

(1) When any evidence of rodent infestation/contamination is found within product packaging.

(2) Packaging penetrated by rodent feces or urine, as evidenced by urine stains or feces visible under normal light or black light.

(3) Existence of one or more holes gnawed through the innermost layer of packaging.

(4) External contamination of waterproof containers (e.g., cans) containing the product, unless it is possible to recondition the container by disinfecting and rinsing under the direction of medical authority. The entire pallet must be condemned when rework cost is estimated to exceed the value of the product salvaged.

f. Handling Rodent Contaminated Products. Be careful when handling rodent contaminated materials.

(1) Wear protective gloves to avoid direct contact with urine or feces.

(2) Decontaminate the surface of infested packages with a bleach solution (three tablespoons per gallon of water) or other sanitizer.

(3) Seal any holes in packaging to prevent leakage, or place damaged packages in a plastic bag.

(4) If entire pallets are condemned, seal them with plastic sheeting and tape. Segregate damaged materials for reimbursement or dispose of them.

g. Because the odor from dead rats in confined spaces of a ship is unacceptable, rodent trapping is the prescribed method for rodent control. Use of poison baits must be approved by a Navy medical entomologist.

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**h. Trap Placement**

(1) The conventional wood base, spring (snap) trap is an effective way to kill rats and mice. Set traps at right angles to the run way, with the trigger end toward the bulk head (Fig. 2-28). Once traps are in use, replace bait every 2 days. Set traps on the deck behind objects that are stacked close to a bulkhead and between crates. Boxes can be positioned to create directed runways to force the rodents to pass over the traps (Fig. 2-29). Since rodents jump, placing several traps side by side will increase trapping opportunity.

(2) Place traps so as not to be visible from the passage way entrances. Secure traps to prevent an injured rodent from crawling off. Secure vertical traps to overhead pipes, beams, and wires, or wherever runways are identified. Leave visible warning of set traps to prevent injury to unsuspecting personnel.

(3) Rodents, being creatures of habit, will frequently avoid traps as unfamiliar items in the environment so it may take a few days before success. Ensure a trap set is steady, because rodents will not step onto an unsteady surface. When setting the trap, fasten the bait securely to the trigger with cheesecloth or by wrapping it in 2 x 2-inch gauze square before attaching it to the trigger. This prevents the rodent from taking the bait without springing the trap. After affixing the bait set the trigger on the traps.

(4) The trigger may be expanded with cardboard, stainless steel, or screen wire to increase the contact area of the trigger and its sensitivity (Fig. 2-28).

(5) Before reusing heavily soiled or bloodied traps, wash traps with hot water and mild soap, if necessary. Lightly soiled traps are preferred by rats over very clean traps. They are not repelled by human odors.

i. Glue boards (NSN 3740-01-240-6170) have been effective in reducing small populations of mice if properly placed in the area of rodent activity.



Fig. 2-28 Expanded trigger

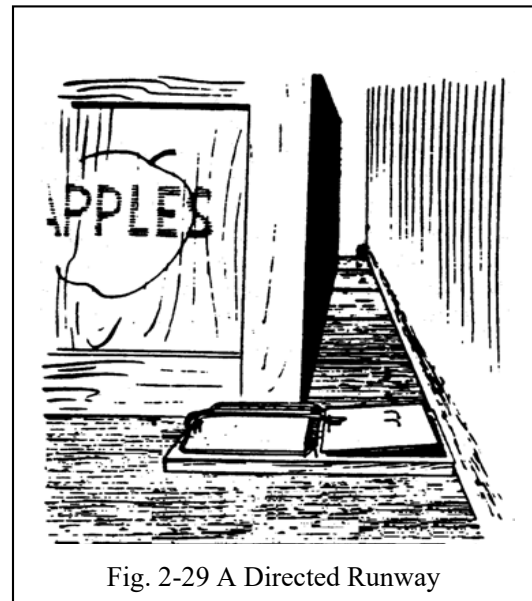


Fig. 2-29 A Directed Runway

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2-7. Miscellaneous Shipboard Pests

1. Bed Bugs

a. Bed bugs are oval-shaped and flat blood-sucking insects that feed on sleeping hosts. Adults are approximately 7 mm long. They appear brownish in color, are wingless, and have piercing-sucking mouthparts (Fig. 2-30). They may be found aboard ship and are easily transferred from living quarters to ship berthing or from ship berthing to living quarters.

b. These insects are not vectors of any known human disease but many people consider the presence of these insects and their bites extremely annoying. These insects can seriously affect crew morale and create a force protection issue by preventing sleep and rest due to fear of sleeping in bed bug infested berthing and then reporting to duty tired increasing chance of operational mistakes.

c. Biology

(1) Bed bugs hide during the day in mattress seams, curtains, and other small cracks and crevices in sleeping quarters. They may live for several months without a blood meal. They usually feed at night, and the host is usually unaware of being bitten.

(2) Other than finding an active infestation, signs of bed bug infestations are tiny spots of dark fecal spots on the sheets from feeding, cast skins, or the presence of dead insects.

(3) People vary in their reactions to bed bug bites. Some may experience intense itching and a large inflamed area at the bite site. Bites often occur on the face, neck, arms, and hands.

(4) Bed bugs glue their eggs to the surface of cracks and crevices. Aboard ship, they may lay their eggs in privacy curtains or in the retention strap on bunks. A female can lay up to 200 eggs at the rate of 1 to 5 per day. Eggs hatch in 6 to 10 days under warm conditions, reaching maturity in 1 to 2 months. Bed bug infestations can have a characteristic odor. The odor may be described as unpleasant, sweet, or fruity.

(5) Infestations are not associated with unsanitary conditions though berthing in disarray make inspection for bed bugs difficult. Often inadvertently transported in clothing, baggage, and laundry, they are easily introduced into clean uninfested quarters. When transferring from ship to shore and shore to ship, belongings should be inspected by personnel to ensure no bed bugs are being transferred. When staying in liberty ports, advise personnel to keep personal items off of the deck in hotels or quarters.



Fig. 2-30 Bed bug life stages

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d. Dispersal of bed bugs is usually passive without knowledge of people transferring them from one location to another. Bed bugs are very successful hitchhikers travelling from one location to another by furniture, baggage, boxes, sea bags, or bedding as examples. Once established in a multi dwelling facility, it is rarely known until the populations grow and become a pest noticeable by facility occupants. Once a population becomes established it can become very difficult to control and eradicate the populations.

e. Scheduled surveillance by facilities should be part of the daily routine systematically inspecting rooms in a methodical way to include, bedding, bed frames, head boards, clock radios, and lamps.

f. Chemical Control

(1) Effective bed bug control depends on locating and treating all actual or potential hiding places. These sites are found in any location that provides darkness and protection, not just on the mattress.

(2) To determine the location of harborages, conduct a complete survey of the suspected area in question before considering treatment with insecticides. Following the product label, treat only the seams, folds, and buttons of mattresses with insecticides labeled for bed bug control. Never soak mattresses with spray. Allow mattresses to dry thoroughly and cover before use. Steam cleaning or heat treatment is also an effective strategy to kill bed bugs.

(3) Follow label instructions to treat all cracks and crevices in the infested area, including the corners of bunks, empty lockers, springs, canvas bottoms, grommets, and stanchions. Apply insecticide behind all equipment close to bulkheads. All bunks in the space from which the complaint originated should be treated. Remove privacy curtains and mattress coverings, and bag in place before transferring to laundry. Bed bugs are destroyed during normal laundry procedures. Bags used to transfer items should be tied shut and discarded in a manner that will not re-infest the ship. Ensure you are utilizing aerosol residual insecticides such as PT 221L (NSN 6840-01-561-9669) or CB D-Force (NSN 6840-01-561-9745) or dusts such as CimeXa (NSN 6840-01-679-5585) if you want a treatment that will remain to kill bed bugs, and a contact insecticide such as PT 565 Plus XLO (NSN 6840-00-823-7849) if you want a quick knock down kill with no residual properties.

(4) If unable to treat with insecticide (i.e., submarine underway) spraying live bed bugs with alcohol will kill them on contact. This will not provide a residual protection.

g. Physical Control

(1) Bed bugs must be heated to temperatures  $>45^{\circ}\text{C}$  ( $113^{\circ}\text{F}$ ), the thermal death point for the bed bug. For heat treatment to be effective, it is critical that high temperature and low relative humidity be maintained for a minimum length of 2 hours and ideally for 3-4 hours. Heat treatment provides no residual effect, and bed bugs can re-occupy any treated site immediately after temperatures return to suitable levels. Potential physical distortion of structures or their contents, as well as flammability risks associated with some kinds of heat sources, may be a concern in particular situations.

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(2) Low temperatures can kill bed bugs if they are kept cold long enough. Bed bugs can tolerate  $-15^{\circ}\text{C}$  ( $5^{\circ}\text{F}$ ) for short periods. Freezing furniture or other items within containers or chambers [e.g., below  $0^{\circ}\text{F}$  ( $-19^{\circ}\text{C}$ )] for at least 4 days may be a practical alternative for limited infestations or to augment other control measures.

(3) A vacuum can be used to vacuum up large populations of bed bugs. The vacuum bag should be removed immediately afterward, sealed tightly inside a larger plastic bag, and that bag discarded in a manner that it will not re-infest the ship.

(4) Mattress covers can be used in the case of infestations, but it is essential once a mattress cover has been installed it cannot be taken off, torn, or have any holes for it will allow bed bugs to escape and it will provide new harborage for bed bugs. Any tears must immediately be taped shut. If changing a mattress cover, it must be done pier side to ensure re-infestation of the area does not occur.

(5) If it is required to remove a mattress, first destroy the mattress by cutting the mattress multiple times then, while in place on bunk, wrap the mattress and seal with tape before transporting for disposal.

## 2. Fruit Flies

a. Fruit flies (Fig. 2-31) are occasional pests in food service and berthing areas.

b. These small insects may be brought aboard in infested fruit and vegetables, either in the ship's stores or by crewmembers. Infestations can occur in berthing areas of ships that allow food in berthing. Once aboard, they can breed in rotting fruits and vegetables. They may also be attracted to sugar build-up in cracks and crevices around beverage dispensers.

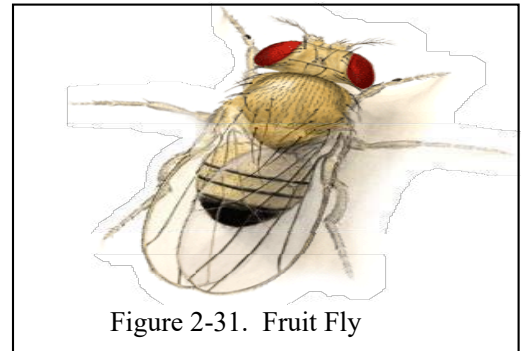


Figure 2-31. Fruit Fly

### c. Biology

(1) Fruit flies are attracted to yeast produced by fruits and vegetables as they ripen and decay.

(2) Fruit flies can occur in large numbers in very small amounts of decaying organic material. Any substance capable of supporting fermentation can act as a source of infestation. Some potential sources include rotting potatoes, dishwater from sinks, or drain water from refrigerators (if allowed to stand), soured swabs or brooms, and clogged drains.

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d. Control

(1) Preventing an infestation requires sanitation and locating and removing the source of infestation may be enough. If the source of infestation is organic debris in cracks and crevices, these areas should be cleaned and sealed.

(2) Chemical control with an approved aerosol contact insecticide to knock down flying adult fruit flies is usually adequate. Personnel should leave the space to be treated, with ventilation secured, and the area closed after treatment for the period of time specified on the label.

(3) Always ventilate the area before re-entry. Do not expose food during treatment, and clean all exposed food contact surfaces after treatment.

3. Phorid Flies

a. Phorid flies (“humpbacked flies”) are active, dark flies, smaller than 1/8 inch that develop in any type of decaying organic material.

b. In addition to their small size and humpbacked appearance (Fig. 2-32), they tend to not fly great distances, but rather have a frenetic “hopping” or “jumping” behavior when disturbed.

c. Phorid flies are often pests in food-handling areas because of the moisture, food and garbage that are often present there. The tiny immature stages develop in drains, algae, food debris in cracks and joints in equipment, wet garbage, or any other source of wet filth.



Fig. 2-32 Phorid Fly

d. Control

(1) Sanitation will prevent phorid flies. If floor drains are present, they should be opened and cleaned well. If you see adult flies in the drain, it is likely a breeding site.

(2) Adult flies can be knocked down with a space spray (see Fruit Fly section for details).



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4. Drain Flies

a. Drain flies (<5 mm in size) can be occasional pests in heads and galleys aboard naval vessels.

b. They breed in damp environments containing organic debris and are often found on the deck and bulkheads near drains, urinals, and shower stalls. They are often called moth flies because they resemble small moths due to the many long hairs lining their body and wings (Fig. 2-33).

c. Control of these flies can be obtained by identifying the breeding source and thoroughly cleaning it with soapy water and a wire brush to destroy the eggs and larvae. An approved aerosolized space spray near the source of infestation will kill the adults.



Fig. 2-33 Drain Fly

5. Bees

a. Biology

(1) Though uncommon, occasionally ships report incidental infestations of bees such as those in figure 2-34. Bees are usually found shipboard during late spring and early summer. Bee swarms on ships are generally short-lived and move on within 48 hours, as ships and ports are not optimal sites for colony production and sustainment.



Fig. 2-34 European Honey Bee

(2) The main crew member safety concern with bee swarms (Fig. 2-35) is the potential threat of stings, which can pose a serious health hazard to those with allergies. Most reports of stings happen when personnel get too close to the swarm or try to remove the bees.



Fig. 2-35 Honey bee swarm on A/C Unit

b. Control

(1) The cognizant NAVENPVNTMEDU or NAVENTOCTR may also provide assistance.

(2) When underway, use soapy water or, with authorization, firefighting Aqueous Film-Forming Foam (AFFF). Wash down equipment afterwards. Soapy water should not be used on electrical equipment to prevent serious electrical shock hazard.

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SECTION III. QUARANTINE ISSUES

3-1. Background. Large volumes of DoD equipment and thousands of personnel move across international boundaries every day. These activities provide many opportunities to accidentally transport a wide variety of pests and disease organisms from country to country. Accidental introductions of organisms into new geographic areas can cause enormous damage to agriculture and health interests, and can adversely impact U.S. foreign relations if an overseas pest introduction is traced to U.S. military activities.

1. The International Plant Protection Convention (IPPC). The IPPC is a multilateral treaty administered through the Food and Agriculture Organization of the United Nations. The IPPC was created to prevent the spread of pests of plants and plant products and to promote measures for their control. It provides a framework and forum for international cooperation and technical exchange, in collaboration with regional and national plant protection organizations. The IPPC is mostly concerned with the shipment of plant and animal products, including timber and farm animals, and foodstuffs. Since the U.S. is a signatory nation, the U.S. Armed Forces fully supports this treaty.

2. Quarantine Regulations of the Navy (OPNAVINST 6210.2A)

a. The OPNAVINST 6210.2A outlines quarantine policies and procedures of the U.S. Public Health Service and the U.S. Department of Agriculture in U.S. Navy programs. It conforms to the regulations of the U.S. Departments of Health and Human Services, Agriculture, Treasury, Homeland Security, Interior, and Commerce. This regulation is intended to prevent the introduction and dissemination, domestically or elsewhere, of diseases of humans, plants and animals, prohibited or illegally taken wildlife, arthropod vectors, and pests of health and agriculture importance.

b. Ships, aircraft, or other conveyances of the Military Services proceeding to a foreign port will meet the quarantine requirements published by the proper authority for such port.

3. Executive Order 13112 (Safeguarding the nation from the Impacts of Invasive Species, 2016). Heightened concern for this ever increasing threat to our food production and natural resources was reinforced on February 3, 1999, with the signing of Executive Order (EO) 13112, Invasive Species, by President Clinton and amended by President Obama in 2016. This EO established an invasive species management policy for Federal agencies, and created the National Invasive Species Council, charged with developing a National Invasive Species Management Plan. The purpose of this order is “to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts [they] cause.”

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3-2. U.S. Navy Vessels Entering U.S. Ports

1. Because the United States has some of the strictest quarantine regulations in the world, the U.S. Navy has an inherently important role in preventing the entry of unwanted organisms into the U.S. When entering the continental United States (CONUS) from foreign countries, Hawaii, or U.S. Territories and its possessions, Federal agricultural quarantine laws apply to U.S. Navy vessels as a condition of entry (CFR Title 9, Animals and Animal Products, and CFR Title 42, Public Health). Inspectors are authorized to board ships, aircraft, and any other means of conveyance of the Armed Forces, and to inspect ports and facilities. Commanders will provide full support for inspections, however, all examinations will be subject to all restrictions necessary to preserve the security of classified material (OPNAVINST 6210.2A).
2. To help ensure an effective quarantine program and protect the United States from importation of exotic pests, the United States Department of Agriculture's (USDA) Animal Plant Health Inspection Service (APHIS) and the U.S. Navy have a memorandum of understanding, through which a USDA and Military Cooperator Program has been established. This program coordinates the inspection of U.S. Navy ships for unwanted organisms, illegal items, and improperly stowed garbage to expedite entry into U.S. ports.
3. U.S. Navy vessels have two officers (or E-7 or above enlisted personnel) who have been trained by the USDA as cooperator plant protection quarantine officers. A SMDR, when possible, should be one of the two cooperator plant protection quarantine officers. Although this program is intended to support USDA quarantine policy and ease entry of U.S. naval vessels into U.S. ports, the same principles, techniques and procedural protocols are applicable to excluding invasive plant and animal species from U.S. naval vessels enroute to foreign ports.

3-3. U.S. Navy Vessels Entering Foreign Ports. Under the tenants of the IPPC, the U.S. Navy has a responsibility to ensure that potentially harmful organisms are not introduced into foreign ports-of-call. It is the responsibility of not only the Medical Department, but also the entire ship's crew to ensure that potentially harmful organisms are not released into another country. This can be best accomplished by immediately reporting infestations observed during routine inspections to the SMDR. Maritime declaration of health and controlled free pratique:

1. U.S. Navy Regulations, articles 0828 and 0859 prohibit inspection of U.S. warships and military aircraft, United States Naval Ship vessels, and afloat prepositioned force ships by foreign personnel.
2. Follow Naval quarantine regulations outlined in OPNAVINST 6210.2A.
3. It is a fundamental principle of international law that ships and aircraft being used in exclusive, non-commercial government service fully assert the privilege of sovereign immunity, that is, freedom from the jurisdiction of foreign nations. This applies whether within a foreign territory, foreign territorial seas and airspace, or international waters and airspace. They will not be subject to inspections or searches by foreign officials for any purpose.

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4. Although immune from law enforcement actions by foreign authorities, U.S. military ships and aircraft proceeding to and from a foreign port under diplomatic clearance must comply with reasonable host country requirements and restrictions on traffic, health, customs, immigration, quarantine, etc. The host country's remedies for U.S. noncompliance, however, are limited to asking sovereign immune U.S. ships or aircraft to comply, pursuing diplomatic protest, or ordering sovereign immune ships or aircraft to leave the host country's territory or territorial sea and airspace.

5. Commanding officers, masters, and aircraft commanders may themselves, or through their representative, certify compliance with host country quarantine regulations and restrictions to foreign health officials. If requested by host country authorities, certification may include a general description of measures taken by U.S. officials to comply with local requirements. Unless otherwise stipulated, certification can be provided as a locally prepared Maritime Declaration of Health by the SMDR.

6. At the discretion of the commanding officer, master, or aircraft commander, foreign officials may be received on board for the purpose of receiving certification of compliance. The foreign official should then provide a Controlled Free Pratique for the ship. A Controlled Free Pratique grants a ship permission to enter a port, disembark, and begin operation under stipulated conditions. Foreign officials may not inspect the ship or aircraft, or act as observers while U.S. personnel conduct inspections. Actions by foreign officials must be reported immediately to the chain of command and the U.S. Embassy.

7. Each country will have its own quarantine concerns and regulations. Before leaving on deployment, gather country specific quarantine regulations for scheduled or unscheduled port visits. You can obtain this information from NAVENTOCTR and the NAVENPVNTMEDUs.

3-4. Shipboard Sanitation Control Exemption Certificates and Shipboard Sanitation Control Certificates. World Health Organization, International Health Regulations (IHR) established worldwide Maritime Declaration of Health requirements and implemented the Shipboard Sanitation Control Program (SSCP) to include Ship Sanitation Control Exemption Certificate (SSCEC) and Ship Sanitation Control Certificate (SSCC) documentation (NAVMED 6210/1) available at: <https://forms.documentservices.dla.mil/nfol/NONSN00013040.PDF>. These replaced the previous deratting certificates provided for under the 1969 IHRs. The current IHRs are designed to prevent, control, and provide a public health response to the international spread of disease in ways that avoid unnecessary interference with international traffic. Deratting certificates are no longer valid. SSCECs and SSCCs are issued to Navy, Army, Military Sealift Command, Coast Guard, National Oceanic Atmospheric Administration, and Maritime Administration National Defense Reserve Fleet vessels. Qualified inspectors who possess Centers for Disease Control and Prevention (CDC) issued seals are currently assigned to either a Navy Medicine Readiness and Training Command, NAVENPVNTMEDU, or a designated ship having a preventive medicine technician assigned to the medical department. NAVMED 6210/3 U.S. Navy Declaration of Health certificate, must be completed by a vessel SMDR and must be

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presented to a respective foreign port health authority upon request. This form is available at: <https://forms.documentservices.dla.mil/nfol/NONSN00013044.PDF>. Generally, completion of this form is not required when Port Authority grants Radio Free Pratique entry approval. Certificates are valid for 6 months from issuance and can be extended one time for 30 days (NAVMED 6210/2). This form is available at: <https://forms.documentservices.dla.mil/nfol/NONSN00013042.PDF>.

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SECTION IV. RECORDS AND REPORTS

4-1. Records. Records of your pest management activities must be kept in your journal or log. The records listed are required or recommended:

1. Material Inventory (recommended). Key inventories that must be routinely maintained include: pesticide safety gear, pest control inspection and surveillance items, pesticide dispersal equipment, pesticides, and miscellaneous parts and supplies.
2. Pier side or Onboard Inspections (required). All inspections of incoming food and non-food items for pest and invasive species following receipt of items pier side, from supply ships at sea, or routinely onboard when underway must be recorded. It is important to describe non-chemical methods of control, when used.
3. SSCEC or SSCC Inspections (required). Record date(s) of inspection, person(s) conducting inspection, and the certifying authority.
4. Courtesy Technical Assistance Visits and Informational Surveys (recommended). Record the date(s) of formal assistance from NAVENTOCTR, NAVENPVNTMEDUs, or other preventive medicine personnel and request an After Action Report for your records.

4-2. Reports

1. Pesticide Use

a. Only use pesticides from the Authorized Shipboard Pesticide List (Appendix A) aboard U.S. Navy vessels, unless approved by a Navy entomologist. Each pesticide use must be recorded, archived, and reported. DoD Instruction 4150.07, DoD Pest Management Program, and OPNAVINST 6250.4C, Navy Pest Management Program require pesticide use during all military operations be recorded, reported, and archived. This requirement includes all pesticide use, except skin and clothing arthropod repellents. To comply with this requirement, all personnel who apply pesticides during military operations ashore and afloat will record and report pesticide applications using DD Form 1532 Pest Management Form. The electronic DD Form 1532 is available at [https://www.esd.whs.mil/Directives/forms/dd1500\\_1999/](https://www.esd.whs.mil/Directives/forms/dd1500_1999/) and instructions on how to fill it out can be found on the Armed Forces Pest Management Board Web site, <https://www.acq.osd.mil/eie/afpmb/index.html>. Each month, these records will be consolidated at each command and forwarded directly to the Navy and Marine Corps Public Health Center via e-mail to (usn.hampton-roads.navmcpubhlthcenpors.list.nmcphe-pesticiderpts@health.mil) for archiving. All operational commands must submit a DD Form 1532 even if no pesticides were used for the month.

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b. COMNAVSURFPAC/COMNAVSURFLANT Instruction 6000.1, Shipboard Medical Department Procedures Manual states pest control surveys will be conducted every 2 weeks at a minimum. Treatments will be accomplished as needed and per published standards. Document all surveys, inspections, and treatments using the Snap Automated Medical System (SAMS) or Theater Medical Information Program-Maritime (TMIP-M) environmental surveillance module.

c. Historically, shipboard pesticide use records have only been maintained in a handwritten pest control log book or electronically through a computer based pest control log contained within the SNAP Automated Medical System (SAMS) software program. However, many of the data entry fields required by DD Form 1532 are missing or out of sequence in current versions of the SAMS program.

d. The only format that will be accepted by the Navy and Marine Corps Public Health Center reporting pesticide use onboard U.S. Navy vessels will be an electronic copy of DD Form 1532. Any attempt to meet this reporting requirement through a format other than DD Form 1532 will negatively impact the ability of Navy and Marine Corps Public Health Center to merge all fleet pesticide-use data efficiently into a single, centralized database.

e. The information provided through this recording and reporting system is essential to document pest control efforts in the fleet, track total pesticide use at specific locations, and identify pest control program deficiencies.

2. Infested Products DD Form 1222 Request for and Results of Tests

a. Reporting an infestation is outlined by the NAVSUP P-486, Food Service Management General Messes, Chapter 5, Part D, section 5301. At the direction of the medical representative, samples of the food product (both normal and abnormal) will be turned in to the nearest NAVENPVNTMEDU or NAVENTOCTR, which will arrange for veterinary inspection of the product. If local veterinary service personnel are unavailable, send samples to the nearest facility (addresses listed here):

Commander  
VETCOM Food Analysis & Diagnostic Laboratory  
ATTN: MCVS-SCL  
2472 Schofield Road, Building 2632  
Ft. Sam Houston, TX 78234  
Commercial: (210) 295-4604 DSN: 421-4604  
Fax: (210) 270-2559

U.S. Army Veterinary Laboratory 64th Medical Detachment (VS) CMR 402  
APO AE 09180-3619 ETS 486-8300/7241  
Commercial: 06371-86-8300/7241

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Food Analysis Laboratory CENPAC DVC  
ATTN: MCVS-PAC-SF  
Bldg. 673, Glennen Road  
Schofield Barracks, HI 96857-5460  
Commercial: 808-433-7925/7926/7928

b. Per NAVSUP P-486, Volume I, insect specimens may be saved for species identification when the ship reaches shore. Insects may be identified by entomologists at the nearest NAVENPVNTMEDU or NAVENTOCTR, Jacksonville, Florida. Non-living samples will be sent with an original and four copies of the Request for and Results of Tests (DD Form 1222). If a DD Form 1222 is not available, a letter request will be submitted containing all the pertinent data contained on the form. A representative number of backup samples will be retained until test results are known, provided that retention will not constitute a health or sanitary hazard. Following identification, the DD Form 1222 will be returned to the submitting activity. Test results will be transmitted expeditiously, usually by telephone. Minimum requirements for submitting specimens include:

(1) Preserving at least two specimens in 70 percent ethyl alcohol (or isopropyl alcohol, if ethyl alcohol is unavailable).

(2) Adult moths should be submitted dry in vials without alcohol. This prevents the identifiable wing scales from coming off, which would render the specimen unidentifiable.

(3) Whether a dry or alcohol-filled vial is used, place tissue (do not use cotton) in each end of the vial to prevent movement of the specimens during mailing or hand delivery. If cotton is used instead of tissue, specimens will be tangled in the fibers, and extremely hard to free for identification without damaging. Several specimens of the same suspected type from the same collection site can be packed in a single vial, alternating layers of tissue on either side of each specimen.

(4) Carefully pack all vials or cardboard protected paper envelopes in thick, well-padded mailing envelopes or cylinders before final shipping.



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SECTION V. PESTICIDES

5-1. Pesticide Label

1. Before applying any pesticide, read all label directions for use and precautions. Review the Safety Data Sheet (SDS) and any other product information sheets that may be available. The text on the label and the SDS has been carefully written and contains information on the safe and effective use of the product. The contents and format of pesticide labels are specified under Federal law. Pesticide labels must provide the information listed:

- a. Name, brand, or trademark under which the product is sold.
- b. Name and address of the producer, registrant, or person for whom the product was produced.
- c. Net weight or measure of contents.
- d. Environmental Protection Agency (EPA) registration number.
- e. Producing establishment registration number.
- f. Ingredient statement.
- g. Warning or precautionary statement.
- h. Statement of use classification.
- i. The statement, "It is a violation of Federal law to use this product in a manner inconsistent with its labeling."
- j. Directions for use, including:
  - (1) Sites of application.
  - (2) Target pests associated with each site.
  - (3) Dosage rate associated with each site and pest.
  - (4) Method of application and types of application apparatus or equipment required.
  - (5) Frequency and timing of applications necessary to obtain effective results without causing unreasonable adverse effects on the environment.

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- (6) Specific time limitations on re-entry to areas where the pesticide has been applied.
  - (7) Specific directions concerning storage and disposal of the pesticide and its container.
  - (8) Any limitations or restrictions on use required to prevent unreasonable adverse effects.
- k. Category of toxicity. The text required on the front panel of the label is determined by the toxicity category of the pesticide. Toxicity categories, precautionary statements, and key signal words are listed on the next page in Table 5-1.

Table 5-1. Toxicity categories, precautionary statements, and key signal words (oral, inhalation, or dermal toxicity and eye local effects <sup>1</sup> )			
Category	Precautionary statements	Signal word	LD50 (mg/kg)
I	Fatal (poisonous) if swallowed, inhaled, or absorbed through skin  Corrosive, causes eye and skin damage (or skin irritation)	Danger Poison	0-50
II	May be fatal if swallowed, inhaled or absorbed through skin  Causes eye (and skin) irritation	Warning	50-500
III	Harmful if swallowed, inhaled or absorbed through skin  Avoid contact with skin, eyes or clothing. In case of contact, immediately flush eyes or skin with water	Caution	500-5000
IV	No precautionary statements required	Caution	>5000
<sup>1</sup> Eye tissues are particularly absorbent. Besides chemical injury to the eyes, some pesticides may be absorbed in sufficient amounts through the eye to result in serious or fatal illness.			

2. Pesticide Safety. To ensure mission success and personnel safety, apply insecticides only following the label and the SDS.

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3. Routes for Pesticide Exposure. There are three routes of exposure by which poisoning can occur. Pesticides can enter the body through: (1) the mouth (oral ingestion), (2) the nose or lungs (inhalation or respiratory exposure), and (3) the skin (dermal absorption).

4. Oral. Oral pesticide poisoning occurs when pesticides or pesticide-contaminated items are ingested. To prevent oral pesticide poisoning:

- a. Always check the pesticide label for special instructions or warnings concerning exposure.
- b. Never eat, drink, or smoke while handling pesticides.
- c. Always wash hands and arms thoroughly with soap and water after using pesticides and especially before eating or drinking.
- d. Never touch the lips to pesticide-contaminated objects or surfaces. Never clear pesticide dispersal equipment nozzles by blowing or siphoning by mouth.
- e. Never wipe the mouth with forearms, hands, clothing, or rags contaminated with pesticides.
- f. Never expose food, beverages, utensils, or food and beverage containers to pesticides.
- g. Never store pesticides in unlabeled containers.

5. Inhalation or Respiratory Exposure

a. Inhalation pesticide poisoning occurs when persons are exposed to aerosols, mists, and dusts.

b. Applying pesticides in confined spaces increases the potential for respiratory exposure. To prevent inhalation pesticide poisoning:

(1) Always wear a properly fitted NIOSH-certified respirator, specifically approved for use with pesticides. OPNAVINST 5100.19F and OPNAV Manual 5100.23 provide specific guidelines on respirator use aboard ships. Personnel using respirators must have had a medical evaluation and been properly fit-tested. Personnel using respirators also must be provided training in proper respirator usage and care, and be included in the command's respiratory protection program.

(2) Always inspect the respirator before each use to ensure that it fits and functions properly.

(3) Check for cracks and proper fitting of valves, filters, and cartridges.

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(4) Always change the respirator filter cartridge after every 8 hours of use, or sooner if pesticide odors are detected while wearing the respirator. To ensure 8 hours are not exceeded, mark the respirator filter cartridge for each hour of use.

(5) Always restrict unprotected personnel from entering areas where pesticide operations are being conducted, and for at least 30 minutes after spraying, or until the space can be properly ventilated.

6. Dermal Absorption

a. Dermal pesticide poisoning can occur when pesticides contact the skin. Dermal exposure is the most frequent route of pesticide poisoning. High temperatures, dermatitis, or damage to the skin (e.g., sunburn) can increase the dermal absorption rate of a pesticide 4 to 10 times.

b. To prevent dermal pesticide poisoning:

(1) Immediately wash any pesticide from the skin with soap and water to minimize absorption of pesticides.

(2) Always read the pesticide label and follow all recommended personal protection measures against exposure to the pesticide before use.

(3) Select and wear proper personal protective clothing to ensure skin contact with the pesticide does not occur. Coveralls with long sleeves and made of closely woven material should be worn. At the minimum, wear long-sleeved shirts and long pants.

(4) Always wear waterproof headgear, such as a hard hat, when working with pesticide mists or conducting overhead spraying.

(5) Always wear unlined neoprene, nitrile, or rubber gloves.

(6) Never wear contact lenses when handling pesticides.

(7) Always wear well fitting, non-vented, or indirectly vented goggles to prevent eye contamination.

(8) Never wipe the eyes with forearms, hands, clothing, or rags contaminated with pesticides. If pesticides get in the eyes, flush eyes with a gentle stream of clean water for at least 15 minutes, then seek prompt medical attention.

(9) Always wash with soap and water after using pesticides, especially before eating, drinking, smoking, or using the toilet.

(10) Always launder clothes and coveralls after each pesticide application.

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5-2. Personal Protective Equipment (PPE). Requirements and training for wearing appropriate personal protective devices are provided in OPNAV Manual 5100.23, Navy Safety and Occupational Health Manual; OPNAVINST 5100.19F, Navy Safety and Occupational Health Program Manual for Forces Afloat; Title 2 Code of Federal Regulations (CFR), part 1910; and the pesticide label. Respirators must be NIOSH-approved for the pesticides used. Refer to the product label for specific guidance for selecting essential pest control protective equipment.

1. PPE for Shipboard Pest Control Programs. PPE for shipboard pest control and their applicable National Stock Numbers (NSN) are listed in Appendix C. Additional information on PPE is located in the Shipboard Safety Equipment Shopping Guide available from the ship's safety officer.

2. Cleaning and Storage of PPE

- a. Store and properly maintain PPE to ensure its effectiveness.
- b. Always clean PPE after each use. Clean respirators, gloves, goggles, and boots in warm water with mild detergent.
- c. Always store PPE in a clean, dry area away from pesticides and pesticide dispersal equipment.

5-3. Procurement of Pesticides and Pesticide Dispersal Equipment

1. Standard materiel requisitions for NSN pesticides (Appendix A) and pesticide dispersal equipment (Appendix B) will be submitted directly through normal supply channels.
2. If you are unable to procure insecticides that are on the vessel's authorized use list, coordinate with your cognizant NAVENPVNTMEDU or NAVENTOCTR (Appendix D) for assistance with insecticide procurement prior to deployment. The requisition of non-standard pesticides or equipment must be authorized by a Navy medical entomologist.

5-4. Pesticide Storage

1. Store all pesticides in safe, secure (locked), well identified areas that meet shipboard ventilation specifications. Keep pesticides in approved flammable storage lockers.
2. Never store pesticides inside patient care areas. Store pesticides according to label and SDS requirements.
3. Store pesticides in the original labeled container with the label clearly visible. Ensure the container is tightly sealed and the cap on the aerosol can is in place and secure.

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4. Never store pesticides near food or drink.
5. Always store pesticides in areas protected from freezing or excessive heat.
6. Stock rotation (first in – first out) helps to prevent pesticides expiring.

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APPENDIX A  
REFERENCES

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APPENDIX B

AUTHORIZED SHIPBOARD PESTICIDE LIST

Most current shipboard products can be found in the Armed Forces Pest Management Board (AFPMB) Contingency Pest Management Products (<https://www.acq.osd.mil/eie/afpmb/index.html>)

Item	Active ingredient	EPA Reg. #	Unit package	Unit issue	NSN
Insecticide, cockroach bait station, regular size (Combat <sup>®</sup> Source Kill Max R1)	0.03% fipronil	64240-33	12 bait stations/box/ 12 boxes	PG	6840-01-180-0167
Insecticide, cockroach bait station, large size (Combat <sup>®</sup> Source Kill Max R2)	0.03% fipronil	64240-34	8 bait stations/box/1 2 boxes	PG	6840-01-224-1269
Insect repellent, clothing application, aerosol (Permethrin Arthropod Repellent)	0.05% permethrin	50404-5	(12) 6-oz cans	BX	6840-01-278-1336
Insect repellent, personal application (3M)	33.33% DEET	58007-1	(12) 2-oz tubes	BX	6840-01-284-3982
Insect repellent, personal application (Natrapel)	20% picaridin	39967-53	(12) 3.5-oz bottles	BX	6840-01-619-4795
Insecticide, Boric Acid, aerosol (Perma-Dust <sup>®</sup> PT 249)	35.5% Boric acid	499-384	(12) 9-oz cans	BX	6840-01-287-3938
Insecticide, d-Phenothrin, aerosol	2% d-Phenothrin	901-82	12-oz can	CN	6840-01-412-4634
Insecticide, Pyrethrin, aerosol (PT <sup>®</sup> 565 Plus XLO)	0.5% pyrethrins 1% piperonyl butoxide 1% n-octyl bicyclohept	499-310	(12) 20-oz cans	BX	6840-00-823-7849
Insecticide, Maxforce <sup>®</sup> FC Magnum Roach Killer Bait Gel	0.05% fipronil	432-1460	12-33 gm reservoirs	BX	6840-01-602-8269
Insecticide, Maxforce <sup>®</sup> FC Roach Killer Bait Gel	0.01% fipronil	432-1259	24-60 gm reservoirs	BX	6840-01-483-3065
Insecticide, Maxforce <sup>®</sup> FC Roach Killer Bait Gel	0.01% fipronil	64248-14	4-30 gm reservoirs	BX	6840-01-471-5650
Insecticide, Avert <sup>®</sup> Dry Flowable Cockroach Bait Formula I	0.05% abamectin B1	499-294	12 30-gram tubes per box	BX	6840-01-561-9766
Insecticide, Avert <sup>®</sup> Cockroach Bait Station Formula 1	0.05% abamectin B1	499-467	72 stations per bag, 4 bags per box	BX	6840-01-561-9649
Insecticide, PT <sup>®</sup> 221L Residual Insecticide aerosol	0.05% λ-cyhalothrin	499-473	12 aerosol containers per box	BX	6840-01-561-9669

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APPENDIX B  
AUTHORIZED SHIPBOARD PESTICIDE LIST  
(Continued)

Item	Active ingredient	EPA Reg. #	Unit package	Unit issue	NSN
Insecticide, PT® CY-KICK aerosol	0.1% cyfluthrin	499-470	6 aerosol containers per box	BX	6840-01-561-9717
Insecticide, CB D-Force™ HPX Residual Insecticide	0.06% deltamethrin	9444-217	8 aerosol containers per box	BX	6840-01-561-9745
Insecticide, Gentrol® Point Source®	90.6% hydroprene	2724-469	20 per box	BX	6840-01-501-2905
Temprid Ready to Spray	0.05% Imidacloprid, 0.025% beta-Cyfluthrin	432-1527	15-oz can	CN	6840-01-642-9292
Cutter Backwoods DEET Insect Repellent Pump Spray	25% DEET	305-61-121	(12) 6-oz bottles	BT	6840-01-584-8598
DeltaDust®	0.05% Deltamethrin	432-772	1-lb container	LB	6840-01-431-3345
Insecticide, CimeXa	Silicon Dioxide as Amorphous Silica.92.1%	73079-12	4oz container or 5lb pail	LB	6840-01-679-5585
ZENPROX Aerosol	0.15% Pyrethrins, 0.5% Tetramethrin, 1.0% Etofenprox, 1.5% Piperonyl Butoxide	2724-675	(6) 16-oz	BX	6840-01-619-6396
PT® Wasp-Freeze® II	0.1% Prallethrin	499-550	(12) 17.5-oz cans	BX	6840-00-459-2443

PESTICIDES RECOMMENDED FOR CONTROL OF PESTS

		Long-term Control	
Pest	Flushing and Quick Kill	Bait	Residual Pesticide
Cockroaches (Read label for restrictions)	PT® 565 Plus XLO, d-Phenothrin PT® CY-KICK ZENPROX Aerosol	Combat® Source Kill, Max Maxforce® FC Roach Killer, Avert® bait stations, Avert® Dry Flowable Powder	CimeXa™ D-Force™ HPX, Perma-Dust®, PT® 221L, PT® CY-KICK, d-Phenothrin, Gentrol Point Source®, DeltaDust®
Stored product pests	PT® 565 Plus XLO, ZENPROX Aerosol		D-Force™ HPX, PT® 221L, PT® CY-KICK, CimeXa™, Gentrol Point Source®, DeltaDust®
Bed bugs	PT® 565 Plus XLO, d-Phenothrin, ZENPROX Aerosol		CimeXa™, D-Force™ HPX, DeltaDust®
Flies (Read label for restrictions)	PT® 565 Plus XLO d-Phenothrin		

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PESTS LISTED ON INSECTICIDE LABEL

Item	Pests Labeled for Control
Combat® Source Kill cockroach bait station, regular	German Cockroaches
Combat® Source Kill Max R2 cockroach bait station, large	Larger Cockroaches
Permethrin arthropod repellent for clothing	Protection from biting arthropods
DEET repellent for skin	Protection from biting arthropods
Picaridin spray repellent for skin	Protection from biting arthropods
Perma-Dust® PT 249 aerosol	Ants, booklice, boxelder bugs, carpenter ants, carpenter bees, centipedes, chocolate moths, clover mites, cluster flies, <b>cockroaches</b> , crickets, <b>dermestids</b> , <b>drugstore beetles</b> , earwigs, elm leaf beetles, firebrats, <b>flour beetles</b> , <b>grain weevils</b> , ground beetles, <b>Indian meal moths</b> , millipedes, pill bugs, scorpions, silverfish, sow bugs, spiders, and <b>trogodermas</b>
d-Phenothrin aerosol	<b>Cockroaches</b> , mosquitoes, house flies, <b>gnats</b> .
PT® 565 Plus XLO	Angoumois grain moths, ants, <b>bed bugs</b> , booklice, carpet beetles, centipedes, chocolate <b>moths</b> , <b>cigarette beetles</b> , clover mites, cluster flies, <b>cockroaches</b> , <b>confused flour beetles</b> , crickets, <b>drug store beetles</b> , fleas, <b>flies</b> , <b>fruit flies</b> , <b>gnats</b> , grain mites, <b>granary weevils</b> , horn flies, <b>house flies</b> , <b>Indian meal moths</b> , <b>Mediterranean flour moths</b> , millipedes, mosquitoes, mud daubers, <b>red flour beetles</b> , <b>rice weevils</b> , <b>saw-toothed grain beetles</b> , silverfish, <b>small flying moths</b> , sow bugs, spiders, stable flies, and wasps
Maxforce® FC Roach Killer Bait Gel	Cockroaches
Avert® Cockroach Bait Station Formula I	Cockroaches
Avert® Dry Flowable Cockroach Bait Formula I	Cockroaches
PT® 221L Residual Insecticide aerosol	Ants, booklice, boxelder bugs, carpenter ants, carpenter bees, centipedes, chocolate moths, clover mites, cluster flies, <b>cockroaches</b> , crickets, <b>dermestids</b> , <b>drugstore beetles</b> , earwigs, elm leaf beetles, fire ants, <b>flour beetles</b> , grain weevils, millipedes, scorpions, silverfish, sow bugs, spiders, springtails, above-ground termites, ticks, <b>trogoderma (cabinet, khapra and warehouse beetles)</b> , wood infesting borers and beetles and wood wasps
PT® CY-KICK aerosol	Ants, booklice, boxelder bugs, carpenter ants, carpenter bees, centipedes, chocolate moths, clover mites, cluster <b>flies</b> , <b>cockroaches</b> , crickets, <b>dermestids</b> , <b>drug store beetles</b> , earwigs, elm leaf beetles, <b>flour beetles</b> , grain <b>weevils</b> , millipedes, scorpions, silverfish, sow bugs, spiders, springtails, termites*, ticks, <b>trogoderma (cabinet, khapra, and warehouse beetles)</b> , wood-infesting borers and beetles, and wood wasps
D-Force® HPX residual aerosol	Ants, bees, <b>bedbugs</b> , <b>carpet beetles</b> , centipedes, <b>cockroaches</b> , crickets, firebrats, fleas, <b>flour beetles</b> , <b>grain beetles</b> , ground beetles, gnats, <b>midges</b> , mole crickets, <b>moths</b> , pill bugs, silverfish, sow bugs, spiders, ticks, termites (subterranean, formosan and drywood), carpenter ants and carpenter bees

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PESTS LISTED ON INSECTICIDE LABEL  
(Continued)

Item	Pests Labeled for Control
Gentrol Point Source®	Cockroaches and <b>stored products pests</b>
DeltaDust®	Ants, fleas, <b>cockroaches</b> , silverfish, ticks, boxelder bugs, fleas, crickets, ground beetles, millipedes, scorpions, spiders, sow bugs, wasps, bees, clothes moths, carpet beetles, <b>bed bugs</b> , and crawling <b>stored product pests</b>
ZENPROX Aerosol	<b>Bed bugs</b> , ants, carpet beetles, <b>cockroaches</b> , crickets, earwigs, firebrats, fleas, <b>flour beetles</b> , <b>grain beetles</b> , pill bugs, silverfish, sow bugs, and spiders
CimeXa™	Ants, <b>Cockroaches</b> , Silverfish, Spiders, Mites, <b>Bed Bugs</b> , Lice, Fleas, Ticks, Firebrats, <b>Stored Product/Pantry/Fabric/Clothes Beetles and Moths &amp; Drywood Termites</b>
PT® Wasp-Freeze® II	Wasps, hornets, yellow jackets, bees, and spiders
<b>Note: Bolded pests are those more likely found aboard ships</b>	

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APPENDIX C  
PEST CONTROL EQUIPMENT AND SUPPLIES

Nomenclature	NSN
Brush (small; to transfer insects)	8020-00-503-0000
Flashlight	6230-00-243-6069
Funnel, polyethylene, 1 quart	7240-00-404-9793
Funnel, polyethylene, 2 quart	7240-00-404-9795
Magnifier (reading glass)	6650-00-252-6250
Rat guard, ship, 38" diameter	2040-00-272-2353
Rat guard, ship, 48" diameter	2040-00-272-2355
Traps, mouse, 3 or 4 way snap, wood base	3740-00-252-3384
Traps, rat, spring, wood base, 1 dozen	3740-00-260-1398
Trap, glue, rodent, box of 24	3740-01-240-6170
Traps, cockroach, box of 300	3740-01-096-1632
Sieve, Wire Cloth, all sizes	No NSN, search DoD Email
Vials, collection, entomology specimen, 6-dram with polyseal cap, 23-mm diameter, and 85-mm length	3740-01-454-2354
Sprayer (hand compressed air), pesticide, manually carried, 1-gal stainless tank, with pressure gauge. Formerly MIL-S-14102, replaced by commercial item description (CID) A-A-55748. Flow rate – 0.8 l/min. Current inventory on hand does not include a spare parts package. Future purchase will include three sets of spare parts including: crack and crevice tip assemblies, nozzle gaskets and “O”- rings, plunger cups, check valves, and strainer and filters. Cage code 58536	3740-00-191-3677
Sprayer, pesticide, manually carried, Whitmire System III single pack, part number 20- 2300, includes pouch for three product aerosols and a 10 foot memory coiled hose. Pesticide aerosols must be ordered separately. Cage code 67184	3740-01-338-5390
Sprayer, pesticide, manually carried, B&G aerosol dispersal unit	3740-01-561-9633
Ultraviolet light (specimen examining)	6530-01-451-5144
Ultraviolet light, replacement bulb	6210-01-449-3170

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APPENDIX D  
PERSONAL PROTECTIVE EQUIPMENT

Nomenclature	Model	Size	NSN
Coveralls, Disposable Tyvek			DoD Email
Coveralls		Small Short	8405-00-082-5529
		Small Regular	8405-00-082-5530
		Small Long	8405-00-082-5531
		Medium Short	8405-00-082-5532
		Medium Regular	8405-00-082-5533
		Medium Long	8405-00-082-5534
		Large Short	8405-00-082-5535
		Large Regular	8405-00-082-5536
		Large Long	8405-00-082-5537
		X-Large Short	8405-00-082-5538
		X-Large Regular	8405-00-082-5539
Gloves, chemical resistant		Size 9	8415-00-823-7458
		Size 10	8415-00-823-7459
		Size 11	8415-00-823-7460
Respirator, Half face (3M Brand)	7500 Series	Small	4240-01-495-1294
	7500 Series	Medium	4240-01-495-1293
	7500 Series	Large	4240-01-495-1291
Respirator, Half face (North Brand)	550030 series	Large	4240-01-249-9261
	550030 series	Medium	4240-01-249-9262
	550030 series	Small	4240-01-249-9263
Filter Cartridge, Organic Vapor	3M P/N 6001 OV		4240-01-246-5407
	North P/N 7581P100		4240-01-249-2573
Goggles, Industrial			4240-00-190-6432
Helmet, Safety		Size 6-3/4 to 7-1/2	8415-00-935-1901
		Size 6-1/2 to 8	8415-00-935-3131
<p>Note 1: Consult the Shipboard Safety Equipment Shopping Guide available from the ship's safety officer for other PPE.</p> <p>Note 2: All PPE listed is from AFPMB Technical Guide 14: Personal Protective Equipment for Pest Management Personnel.</p> <p>Note 3: Disposable tyvek coveralls do not have an NSN and can be found by searching DoD Email.</p>			

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APPENDIX E  
NAVY SHIPBOARD PEST MANAGEMENT TRAINING CENTERS

Navy Entomology Center of Excellence  
P.O. Box 43 Naval Air Station  
Jacksonville, FL 32212-0043  
DSN: 942-2424 Commercial: (904) 542-2424  
FAX: (904) 542-4324  
PLAD: NAVENTOCTR JACKSONVILLE FL

Navy Environmental and Preventive Medicine Unit TWO  
1285 West D, BLDG U238  
Norfolk, VA 23511-3394  
DSN: 377-6600 Commercial: (757) 953-6600  
FAX: (757) 953-7212  
PLAD: NAVENPVNTMEDU TWO NORFOLK VA

Navy Environmental and Preventive Medicine Unit FIVE  
Naval Station, Box 368143, BLDG 3235  
3035 Albacore Alley  
San Diego, CA 92136-5199  
DSN: 526-7070 Commercial: (619) 556-7070  
FAX: (619) 556-7071  
PLAD: NAVENPVNTMEDU FIVE SAN DIEGO CA

Navy Environmental and Preventive Medicine Unit SIX  
385 South Ave. BLDG 618  
JBPHH, HI 96860  
DSN: (315) 471-0237 Commercial: (808) 471-0237  
FAX: (808) 471-0157  
PLAD: NAVENPVNTMEDU SIX PEARL HARBOR HI

Navy Environmental and Preventive Medicine SEVEN  
PSC 819 Box 67  
FPO AE 09645-0067  
DSN: 314-772-2270  
PLAD: NAVENPVNTMEDU SEVEN

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APPENDIX F  
SHIP'S PESTICIDE INVENTORY AND  
PIER SIDE INSPECTION LOG ENTRY SAMPLES

Pesticide Inventory					
Log entry number	Location	Date	Item	Uses	Amount on hand
1	Paint locker	29 DEC 00	D-Phenothrin (2%) aerosol NSN 6840-01-412-4634	Cockroaches and mosquitoes	(10) 12-oz cans
2	Paint locker	29 DEC 00	Whitmire Micro-Gen PT® Engage®, 0.5% chlorpyrifos, aerosol NSN 6840-01-338-2487	Cockroaches	(8) 20-oz cans
3	Paint locker	29 DEC 00	Whitmire Micro-Gen PT® Perma- Dust®, 35.5% Boric acid, aerosol NSN 6840-01-287-3938	Cockroaches	(12) 9-oz cans

Pier Side Inspection						
Log entry number	Location	Date	Item	Type of Pest	Uses	Name of Inspector
1	Pier 7, San Diego, CA	28 DEC 00	Bag of onions	German Cockroach. 2 Nymphs, 3 Adults	Informed SUPPO, filled out DD Form 1222, removed bagging and took onions to galley for washing.	HM2 Jones
2	Pier 4, Sasebo, Japan	10 JAN 01	Bag of Flour	1 - Dermestid beetle larva	Informed SUPPO. Sample with DD Form 1222, msg to DSCP, Philadelphia., PA. refused loading	HM2 Jones
3	Pier 8, Everett, WA	26 FEB 01	Farina (Crème of Wheat)	Saw-toothed grain beetle; Twelve adults per pound	Informed SUPPO, Filled out DD Form 1222, refused loading.	HM2 Jones



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APPENDIX G  
STICKY TRAP DATA EXAMPLE

The abbreviated table below represent data from a cockroach surveillance program onboard a U.S. Navy ship. Sticky traps were deployed weekly in the locations listed over the course of 1 month. The table shows a method of recording surveillance data such that each line denotes an individual sticky trap. There were 17 traps deployed each week in the Chief Petty Officer (CPO) galley. Only the CPO galley data is displayed here. Note that it is okay to lose a few traps – simply exclude them from data analysis. From the diagram, you can see areas signified with red represent areas of high numbers of cockroaches, yellow is medium and green is low numbers or no cockroaches present. By utilizing this data you can develop a targeted control strategy to bait cockroaches in high density areas and provide a residual control in low areas to prevent further expansion of the infestation.

Date	Location	Trap Number	Number of Adults	Number of Nymphs	Total Number	Average Number Per Trap	Notes
1-Aug	CPO Galley	1	1	8	9	8	
1-Aug	CPO Galley	2	1	0	1		
1-Aug	CPO Galley	3	1	28	29		
1-Aug	CPO Galley	4	0	4	4		
1-Aug	CPO Galley	5	2	13	15		
1-Aug	CPO Galley	6	0	0	0		
1-Aug	CPO Galley	7	0	0	0		
1-Aug	CPO Galley	8	1	5	6		
1-Aug	CPO Galley	9	2	17	19		
1-Aug	CPO Galley	10	2	15	17		
1-Aug	CPO Galley	11	0	4	4		
1-Aug	CPO Galley	12	0	6	6		
1-Aug	CPO Galley	13	4	19	23		
1-Aug	CPO Galley	14			0		LOST
1-Aug	CPO Galley	15	1	11	12		
1-Aug	CPO Galley	16	0	1	1		
1-Aug	CPO Galley	17	0	0	0		

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APPENDIX H

The map represents a bird's eye view of the CPO Galley used for sticky trap placement and is associated with the above data. Each number coincides with a sticky trap.

