Armed Forces Pest Management Board
Technical Guide No. 42

Self-Help Integrated Pest Management

Published and Distributed by the
Armed Forces Pest Management Board
US Army Garrison—Forest Glen
2460 Linden Lane, Building 172
Silver Spring, MD 20910-1230

Office of the Under Secretary of Defense
(Acquisitions and Sustainment)

April 2015
Updated December 2016

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Foreword

This Technical Guide (TG) is designed to aid in establishment and maintenance of installation self-help pest management programs. At installations with an ongoing self-help program that includes pest management, it offers ideas and methods for maximizing the ability of family housing residents to control pests in their quarters. In addition, this update offers guidance for installations where self-help pest management is extended beyond family housing to other installation activities, and situations where there is no family housing, such as Military Reserve Centers, National Guard Armories, and small isolated military activities where there is no "installation infrastructure." In these situations, the use of self-help by facility managers or unit personnel may be more cost effective than having minor pest control performed by contractors. The use of self-help by government employees in command and staff activities and facilities may not provide a cost savings since the labor is not "free" as in the case of housing occupants. The principles mentioned in this TG may be modified to fit local pest management requirements. When in doubt, contact your installation Integrated Pest Management (IPM) Coordinator or Major Command Pest Management Consultant (or appropriate agency) for guidance.

This is one of a series of TGs published by the Information Services Division (ISD) of the Armed Forces Pest Management Board (AFPMB). The AFPMB is a directorate within the Office of the Assistant Secretary of Defense (Energy, Installations and Environment) that recommends policies and procedures, provides guidance, and coordinates the exchange of information related to pest management throughout the Department of Defense (DoD). TGs are not policy documents. They provide technical guidance for the DoD pest management community. Accordingly, TGs should not be construed or referenced as policy unless specifically cited in DoD policy issuances. DoD pest management policies may be found in DoD Directive 4715.1E, "Environment, Safety, and Occupational Health (ESOH)," DoD Instruction 4150.07, "DoD Pest Management Program," and implementing Component issuances.

Other ISD products include country- or region-specific Disease Vector Ecology Profiles (DVEPs). All TGs and DVEPs are accessible at the AFPMB Web site: http://www.acq.osd.mil/eie/afpmb/index.html.

This TG is effective April 28th, 2015 with minor updates in December 2016. It must be certified current annually to remain in effect. Additions, deletions, corrections, and suggestions for improvement should be directed to the Chief, Information Services Division at (301) 295-7476, DSN 295-7476, fax (301) 295-7473 or via the AFPMB website at http://www.acq.osd.mil/eie/afpmb/contactUs.html

Acknowledgments

Mr. F. J. "Jim" Harrison, Jr., MAJ Todd Walker, Mr. Bill Gebhart, Mr. Wayne Fordham, and members of the Real Property Protection Committee prepared the original TG. This update was spearheaded by Mr. Harrison and contributed to by the members of the Real Property Protection Committee. MAJ Darryl A. Forest, Dr. Richard G. Robbins, and Mr. Terry L. Carpenter of the ISD staff provided editorial support for publication. Minor updates where made by Dr. Doug Burkett in December 2016.

Disclaimer

Trade names are used in this TG to provide specific information and do not imply endorsement of the products named or criticism of similar products not mentioned. Mention of trade names does not constitute a guarantee or warranty of the products by the AFPMB, the Military Services, or the DoD.

Dedication

This TG is dedicated to James Eversole, a former Pest Management Professional (PMP) with Atlantic Division, Naval Facilities Engineering Command (NAVFACENGCOM), Norfolk, VA, who passed away in 1996. At one time, occupants of DoD housing received routine, scheduled and on-demand pest control services. Jim thought there must be a better, more cost effective way to provide pest-free housing. In 1980, he started a program in the Tidewater Housing Area that encouraged occupants to help themselves and was soon expanded to include unaccompanied quarters. Safe, economical, ready-to-use pest control materials like bait stations, traps, and educational materials, were provided to housing occupants. Occupants liked the idea, pesticide use was reduced, and costs were decreased by as much as 90%. Others contributed to developing DoD self-help pest control programs, but Jim was the pioneer who developed the prototype program.

Chapter 1

General

1. References.

a. DODI 4150.07, DoD Pest Management Program, 29 May 2008.

b. OPNAVINST 11000.8J, Self-Help Program in Support of the Navy Real Property Maintenance Program, 23 August 2012.

c. HQ AFCESA, Engineering Technical Letter (ETL) 10-5: Self-Help and Vegetation Management Program, 30 August 2010.

d. AR 200-1, Environmental Protection and Enhancement, 13 December 2007.

2. Purpose: To establish guidelines and methods for implementing an effective self-help pest management program.

3. Background

a. Self-help programs have been in use on DoD installations for over 30 years. Guidance on self-help pest management has been published by the separate Services, including pest management items that occupants could use to control minor pest problems in their quarters. Despite the dwindling number of housing units still under Government management throughout DoD, the use of self-help by non-housing personnel has risen. This is particularly true in the Reserves and National Guard who operate numerous small facilities throughout the United States. As technologies have changed, the Services have reinforced the need for self-help pest management and have updated their lists of approved items. Beyond these published lists of items, an installation may request that other items be approved through their Major Command Pest Management Consultant. This latter option is very rarely used. See Appendix A for a list of products suitable for issue in self-help programs.

b. Self-help pest management programs on military installations continue to be supported in DODI 4150.07. This document stresses the importance of using integrated pest management (IPM) to control minor pest problems in buildings or outdoor areas and minimize the use of pesticides. Building occupants are encouraged to use IPM techniques first before self-help.

4. Responsibilities

a. Director of Public Works/Base Civil Engineer/Public Works or Maintenance Officer.

(1) Establish self-help pest management guidance.

(2) Maintain adequate pest management supplies in the self-help program.

b. Housing Division.

(1) Operate a self-help pest management program for base housing and installation workplace occupants.

(2) Maintain adequate records of pest management items issued to occupants.

(3) Provide pest management classes to newly assigned occupants.

c. Public Works/Civil Engineering Pest Management Section.

(1) Provide personnel to teach the pest management portion of self-help classes.

(2) Provide instructions and self-help pest management items to occupants when performing service calls that do not indicate the need for professional pest management services.

d. Self-Help Manager.

(1) Store and distribute self-help pest management items in a safe manner.

(2) Provide records of pest management items issued to the Public Works/Civil Engineering Pest Management Section.

(3) Maintain copies of Material Safety Data Sheets (MSDSs), self-help pest management information sheets (found in Appendix C, this document), and pesticide labels in the store for use by employees and occupants requesting self-help pesticides.

e. Installation Integrated Pest Management (IPM) Coordinator.

(1) Monitor the distribution of pest management products issued through self-help.

(2) Fully describe the self-help pest management program in the installation pest management plan.

f. Housing Occupants and Non-Housing Personnel Using Self-Help.

(1) Apply good sanitary practices to prevent pest infestations.

(2) Use nonchemical and chemical pest management techniques available through the self-help program to the fullest extent before requesting further assistance from the installation pest controllers.

(3) Apply only those pesticides approved for use by Public Works/Civil Engineering, in a manner consistent with the pesticide label instructions. **THE LABEL IS THE LAW**.

(4) Cooperate fully with Public Works/Civil Engineering personnel and contractors in scheduling pest management operations, to include preparing the areas to be treated.

g. Facility Managers at Military Reserve Centers and National Guard Armories.

(1) Use nonchemical and chemical pest management techniques available through the self-help program to the fullest extent before requesting further assistance from professional pest controllers.

(2) Apply only those pesticides that are approved for self-help use by the applicable Reserve Command, Service Component, or State National Guard Headquarters.

(3) Maintain records of self-help pesticide use in accordance with applicable Service Component directives.

Chapter 2

Why use self-help pest management?

1. It improves the quality of life for family housing residents and other self-help users. Housing occupants want their base housing residence to be considered their home. They often dislike Government personnel, such as pest controllers, disrupting their lives. At the same time, the occupants want the Government to provide them with the materials to control pests since they often consider infestations, particularly in multiple family housing units, to have originated in parts of the Government building that they do not control. Self-help gives occupants the ability to choose a pest control option that maintains the integrity and dignity of their homes. It also allows them to solve their pest problems at their choice of timing. In addition, non-housing personnel want to improve their workplace through self-help.

2. It saves the installation money. Self-help pest management saves the Government money. With the average labor rate of pest controllers approaching $70/hour, the "free labor" expended by residents to control pests reduces the money spent if the residents had called in work orders for pest control. Since the materials provided through self-help cost the Government money, this has to be weighed against the cost of materials used by pest controllers. Because many of the products are devices (e.g., mouse and cockroach traps, and bait stations), which are also used by pest controllers, the cost is roughly the same. There may be some economies of scale realized by pest controllers when they apply commercial pesticide sprays mixed from concentrates or use one can of aerosol product to treat several different buildings, but such costs are far outweighed by the labor differential.

3. It provides timely pest control when routine pest control is reduced. At installations with small numbers of family housing units (e.g., 50 or less), pest controllers can usually perform service calls in quarters on a regular basis without having to add additional personnel. In the past, pest control services to non-housing activities and building occupants were also accomplished in a timely manner. However, with dwindling budget resources, pest control services may be curtailed or delayed due to operating budget shortages. This is particularly true in the Reserves and National Guard who rely heavily on pest control contractors in lieu of centralized Government Public Works or Civil Engineering services. Self-help pest management provides some customers with timely, low cost pest control remedies.

4. It saves time. By having a self-help pest management program in place, occupants select self-help options, pick up the products and instructions to control the pests, and then time their control to coincide with their operational schedules. When the occupant calls in a service request, the pest controllers may not be able to schedule the work for one or more days. For many occupants, the self-help option saves them time and inconvenience.

5. It lets the occupants have more freedom in their quarters. Self-help items can be used by occupants to control pests in their quarters at their own convenience, without the disruption of having to prepare for a service call by local pest controllers. Some residents do not like to have strangers in their homes.

6. It reduces the amount of toxic materials in the quarters. Some residents do not want their pest problems solved with pesticides - nonchemical items available from self-help allow them this option. Whenever pest controllers treat quarters, they are most likely to apply pesticides formulated from concentrates that are not available in the self-help program. Most of these products leave a residual designed to kill pests that come in contact with treated surfaces for 30 days or more. This increases contact between children and pets and pesticide-treated surfaces. When an occupant calls in a service order that could have been handled with self-help materials, the chances that residual chemicals will be applied are increased. Self-help lets the occupant use nonchemical devices or, if chemical products are chosen, items that do not leave a long-lasting residual.

Chapter 3

Self-Help Pest Management Training

1. Training is the key to self-help pest management. This does not mean that occupants are taught which pesticides to use, but rather what methods can be used to exclude or prevent pests from becoming established in their homes or work areas in the first place. When pests do enter homes, other Government facilities, or outdoor areas, occupants and supervisors should know what products control particular pests, and how to use those products effectively. Appendix B contains technical references that may aid self-help trainers and pest controllers, especially with nonchemical control methods.

2. Classes for new residents or non-housing employees and managers on pest prevention and control are extremely important. Unlike many problems that self-help addresses, pest problems tend to get worse with time if not controlled. For example, a burned out light bulb will not get any worse if it is not replaced in a timely manner. However, a few cockroaches or mice can quickly turn into larger numbers of pests if nothing is done. Self-help training is extremely important to anyone who uses the products listed in this guide. Whether self-help is designed for housing occupants or non-housing personnel, each individual who uses the limited pesticides listed in this document must be trained in proper use of the products, health and safety considerations, storage of pesticides, and disposal of used pesticide containers.

3. Brochures should be available to provide information on all the pests that could invade family quarters. Many installations already have brochures, videos, weblinks or other written material that provide information designed to prevent pests from coming into quarters, how to control pests indoors non-chemically, and how to use self-help products. Oftentimes, information on cockroaches and mice can be found locally since these are probably two of the most commonly encountered pests in family quarters or where food is prepared, consumed, and stored. The major commands may also have information sheets on control of various household pests. Written information on control of pests in the home may often be obtained from local county extension services or colleges and universities. Appendix C provides information on the control of many household pests.

4. Training recommendations:

a. Require all newly assigned housing occupants to attend a self-help class on pest management - this can best be done by incorporating pest management into "new occupant orientation."

b. Ensure that self-help pest management classes are taught by installation pest controllers or the Pest Management Coordinator.

c. Show the self-help pest management video during self-help orientation classes.

d. Show the self-help pest management video periodically on the installation television station.

e. Provide written information (at the self-help store) to housing occupants on prevention and control of all pests in family quarters.

f. Ensure that self-help pest management training is available to non-housing employees who use self-help. This may be training on individual products such as wasp aerosols to control these stinging insects or glyphosate to control limited amounts of unwanted vegetation. Instructions on these products may be provided by the local pest controller, the Pest Management Coordinator, or Internet-based training provided by Service schools or regional Public Works centers.

Chapter 4

Self-Help Pest Management Items

1. Standard lists of approved self-help pest management items are published by each Component Service. While the types of items vary from one list to another, the products discussed in this chapter are generally found in self-help throughout DoD. A list of the products discussed below, with stock numbers and trade names, can be found in Appendix A. Requests to add items not on the lists can usually be made through an installation's major command or through the Services' Pest Management Consultants.

2. Pest problems on an installation bring people into self-help. Training classes educate people on pests that commonly invade quarters or other buildings on the installation. In addition, the occupants are given information on what products are available and how to use them.

3. Based on the pests commonly encountered, self-help should provide items (from authorized lists) that can facilitate the best possible control. Local pest controllers can provide information on what species and what time of year certain pests cause problems in family housing units or other facilities. The following information provides a closer look at the items commonly found in self-help programs and also incorporates general trends observed when self-help pest management was recently evaluated.

a. Large Combat® bait station. Large bait stations are usually used for American or Oriental cockroaches. The demand for these items is probably lower due to the relative infrequency of infestations by these larger species of insects, but they should be stocked if larger cockroaches are found on your installation.

b. Small Combat® bait station. This size bait station appears to be the more popular of the two sizes authorized. Since the large bait stations contain the same active ingredient as the small stations, the size of the cockroaches infesting quarters should be the determining factor in stocking traps. Cockroach bait stations appear to be one of the most popular and widely used self-help products.

c. Maxforce® or Advance 360A Dual Choice® ant bait stations. These bait stations are suitable for nearly all ants found indoors. The majority of self-help programs include ant baits. These inexpensive items work well in controlling minor ant infestations.

d. Amdro® fire ant bait. This product is designed for fire ant control. Since these insects are primarily a problem in the southern United States, this ant bait should only be ordered on the advice of local pest controllers or the Services' Pest Management Consultants. Containers of bait should be limited to 6 ounces or smaller.

e. Aerosol insecticide. Although there is controversy among entomologists about the use of pyrethroid-type aerosol insecticides, such products are commonly found in self-help programs.

The arguments over the dangers of aerosols and their potential to promote cockroach resistance probably do not outweigh use of these products for controlling insects other than cockroaches. Mechanical methods, such as vacuuming, can eliminate pests without the use of chemicals, but aerosol insecticides allow the customer to immediately control minor pests that may periodically appear in homes or other facilities. Education that discourages use against cockroaches should be stressed at those installations that issue aerosols. There are currently two pyrethroid aerosol insecticide products authorized for self-help use; either product will provide the same results. NOTE: Wasp freeze, described below, is also an aerosol product but is intended for outdoor use. Do not confuse the pyrethroid aerosol, discussed above, with this product.

f. Cockroach sticky trap. Sticky traps are relatively inexpensive and are one of the most popular pest control items issued in self-help programs. They are easy to use, do not contain pesticides, and work for a variety of insects in addition to the cockroaches for which they are marketed.

g. Wasp freeze and other wasp and hornet aerosols. Designed to kill wasps, this aerosol product provides occupants the means to eliminate stinging insect problems themselves. However, people who are afraid of stinging insects often call pest controllers to solve the problem. Stock this product upon demand. Consult local pest controllers for advice on the types of stinging insect problems found in family housing. **This product is for outdoor use only. People who are allergic to insect stings should not use this product.**

h. Mouse trap. These traps are found at nearly all installations. Unlike most other pest problems, where pest controllers would often use pesticides not available to building occupants, professional control of mice is normally done with traps. By having the occupants set traps for mice, there is a very observable cost savings by not having a pest controller do the same job. Since most mouse infestations are initially limited to one or two mice, usually on a seasonal basis, use of self-help to control mice is an ideal situation for both the occupants and the installation. Traps should be checked daily for mice.

i. Fly sticky tape. While not a popular item, some self-help programs provide this nonchemical method of fly control. On installations where some of the buildings may be located near fly breeding sources off-post (farms, feed lots, stables), fly tapes may be just what the occupants need to help control flies. Local pest controllers can often provide information about fly problems on different parts of the installation.

j. Fly swatter. These devices are more popular than the fly tapes described above. Most installations provide these low-cost items to occupants. Although they are called "fly" swatters, they can be used to kill a variety of flying insects and spiders. This item should be available at all installations.

4. The following list is suggested for basic stockage of those products that control most of the pests encountered by building occupants.

a. Fipronil bait stations. The **small bait stations** may be stocked individually but are easier to issue in packets of six. This will allow the customer to place more than one bait station in the kitchen and/or bathroom, break rooms, or lockers where personal food items are stored, since cockroaches, when noticed, usually number more than one insect. **Large bait stations** should only be added after demand from occupants and consultation with pest controllers.

b. Ant bait stations. Nearly all installations experience ant problems in family housing sometime during the year. For this reason, **MaxForce® or Advance 360A Dual Choice® ant bait stations** should be stocked on a seasonal basis or year-round at southern installations. The **Amdro® fire ant bait** should only be issued upon demand at installations with fire ant problems.

c. Aerosol pyrethroid insecticide. This product allows occupants to control crawling or flying insects. Although fly swatters can be used to control flies and mosquitoes, the numbers of these insects may increase to the point where fly swatters do not do the job. Stock either product year-round, but in larger quantities during the warmer months. **THIS PRODUCT SHOULD NOT BE GIVEN OUT FOR COCKROACH CONTROL.**

d. Cockroach sticky traps. These traps should be available at all times. They are economical, nonchemical, and help control minor cockroach infestations. These traps are also useful for catching spiders, earwigs, and other crawling pests when placed near outside entrances, such as doors or windows.

e. Mouse traps. These nonchemical products should always be available.

f. Fly swatters. This product should always be available for the reasons mentioned earlier. Sticky fly tapes should only be issued if there is a real need; pest controllers can provide information on fly problems in relation to various buildings.

g. Additional self-help items such as **wasp freeze** and **sticky fly tapes** should be issued based on local demand and in accordance with policies dictated by each Service or Major Command.

Chapter 5

How to Issue Pest Management Products

1. Select the products. The basic list of products recommended in Chapter 4 should be stocked. This list may be modified based on previous self-help records, along with input from local pest controllers and/or a professional entomologist familiar with the installation.

2. Determine the Demand. Most self-help programs that include pest control products already have some sort of track record of usage.

a. If a particular product sits on the shelf and is never issued, then either the pest for which it is designed is not a problem in housing and other buildings or pest problems are handled through pest control service requests. Local pest controllers can probably tell you if the latter is true. For example, if all the ant problems in housing are controlled by pest controllers, then the demand for self-help ant bait stations will probably be minimal. In this case, better education and awareness of the availability of bait stations and ant control may shift control efforts from public works to self-help. On the other hand, it may be that there are no ant problems on the installation. If pest controllers never receive service requests for ants, then demand for bait stations will also be low.

b. If pests are found in family housing, there will usually be a demand for self-help products even though public works provides pest control service calls. If housing occupants are asking the self-help clerk for something to control ants, and there are no products in the self-help program, then consideration should be given to stocking ant bait stations. Reserve Centers and National Guard Armories should stock self-help items based on pest history and seasonal demands for products.

c. After a while, there is usually a balance between customer problems and usage. Seasonality needs to be considered, both for demand and for ordering the right quantities of materials. The spring and summer months bring a higher demand for products to control ants, flies and mosquitoes, bees and wasps, and many of the crawling pests such as spiders and scorpions. Adequate supplies should be on hand to deal with these pests when they cause problems. Cockroaches and mice may be year-round problems, necessitating a somewhat constant supply of products to deal with these pests.

d. Finally, fluctuations in funding and supply procedures should be considered. If you know that you are going to need mouse traps in the fall, when mice commonly enter buildings, then supplies should be ordered well enough in advance of the end of fiscal year cut-off date for requisitions. September is not the ideal time to find out you will need mouse traps in October, because you probably will not get them until much later in the year.

3. Determine Quantities to be Issued. The right quantity of pest control supplies needs to be given out to each customer. It is unreasonable to provide one small cockroach bait station when someone indicates that cockroaches have been seen in both their kitchen and bathroom. On the other hand, supplying the customer with more bait stations than they can use costs the Government excess money, denies other customers products, and burdens the customer with materials that are either stored unused or thrown away. Here are some tips on how to manage the quantity of materials given out on a one-time or recurring basis.

a. Cockroach Problems. Cockroach problems probably account for the greatest number of products issued, both in type and quantity.

(1) Small cockroach bait stations often come packaged on a card of six. This quantity will often provide control of minor infestations. If the customer wants more, then two cards (12 bait stations) may be issued, but only if cockroaches have been seen in two different rooms (e.g., kitchen, bathroom, break area). If even more bait stations are requested, the customer should be referred to pest controllers for evaluation of the problem.

(2) Large cockroach bait stations should only be given out for American or Oriental cockroaches. Customers may not know what these species are, but if they indicate that the cockroaches are approximately 1 inch in length or longer, then they probably need the large bait stations. This product will kill the smaller German cockroaches, but the small bait stations will usually not work on the larger species.

(3) Sticky traps are designed to capture cockroaches. These should be given out with the bait stations to provide an extra measure of control and to identify the pest problem, verifying that the right pests are being dealt with correctly. For example, earwigs are insects that resemble German cockroaches. They will get caught in sticky traps but will not eat the cockroach bait. Sticky traps can be given out to catch any pests that crawl across the floor. They are good for crickets, spiders, scorpions, and other pests. Sticky traps are inexpensive and do not contain chemicals. They should be given out liberally, but probably not more than six at any one time. If customers feel they need more than six traps, then their pest problems may need to be evaluated by pest controllers.

(4) As you can see from the information presented thus far, there are many products and devices designed to control cockroaches in buildings. This is in line with the fact that German cockroaches are a consistent pest control workload on some installations. A combination of products is usually the best way to combat cockroaches. Given as a package, the right combination of products will provide control in cabinets, in cracks and crevices, and under appliances. Information on the use of these products should be available in brochures and pest fact sheets.

(5) **Recap of items suggested for cockroach control:**

For smaller infestations: 6 small bait stations (less than 10 cockroaches found on several sticky traps in one room only)

For larger infestations: 6-12 small bait stations (cockroaches found on 6-8 sticky traps in more than one room)

For American and Smokybrown cockroaches: 3-4 large bait stations/room (cockroaches found on 3 sticky traps/room)

b. Mouse Problems. Mechanical mouse traps should be placed perpendicular to a wall with the baited trigger end facing the wall. Rodent glue traps should be placed with the long side against the wall. This will help catch mice since they run along walls and can approach the trap from either direction. Mouse traps are intended to catch one or two mice that may enter a home or other building. They are not designed to eliminate an ongoing mouse infestation where numerous mice are seen. If mice are continually trapped, then pest controllers should be called. **Issue 2-4 mouse traps per request or 4 rodent glue boards.**

c. Crawling Pests. Spiders, ants, crickets, earwigs, and other pests are occasionally found in homes and other buildings. With the exception of ants and silverfish, most of the other crawling pests do not breed and multiply inside buildings.

(1) Ants are one of the hardest pests to eliminate from quarters using self-help materials. Ant bait stations work well, but good sanitation is also important to remove the food source to which ants are attracted. Ants will usually be found in one room but may be seen in several rooms if the infestation has been going on for a long time. **Issue 3-4 ant bait stations per room where ants are seen.** If the customer has ants throughout the building, then pest controllers should be called to evaluate the problem.

(2) Other crawling insects are not readily attracted to ant baits. Sticky traps can be placed on each side of entry doors to capture pests that may crawl over the threshold into the building or that crawl along the walls. **Issue two sticky traps per outside entrance.**

(3) One can of aerosol insecticide will take care of occasional pests. The spray may be useful in killing spiders, scorpions, or other pests that the occupant does not want to touch or go near. Nonchemical methods should be encouraged before the aerosol is dispensed. **Issue one can only upon request.**

d. Flying Insects. This group of pests includes mosquitoes, flies, and wasps.

(1) One can of pyrethroid aerosol insecticide will usually treat several rooms with large numbers of flies, gnats or mosquitoes. Occasionally, even when doorways and windows are screened, flying insects get inside. A fly swatter should be recommended before the aerosol is issued. **Issue one or more fly swatters for flying insect control.**

If fly swatters cannot control the problem, then issue one can of aerosol insecticide. Refer customers to pest controllers for help if more than one can of aerosol product is requested in less than 30 days.

(2) Sticky fly tapes help to control house flies but do not control mosquitoes or gnats. If flies are a problem, then 4-6 tapes per visit should be issued. These are inexpensive and have no chemicals. **Issue 2 fly tapes per room where flies need control.** However, fly tapes should not be suspended above food preparation surfaces or in dining rooms. If the customer continues to have fly problems, often indicated by repeat visits or requests for large numbers of tapes, then the situation needs to be evaluated by pest controllers. Continued fly problems may indicate open or unscreened doors or windows and/or improper disposal of garbage.

(3) Wasp freeze can be issued for control of stinging insects, other than yellow jackets and hornets, **on the outside** of the quarters or other buildings. One container should be sufficient. If the customer wants more products, then a pest controller should be notified. **Issue only one can of wasp freeze per visit.** Because of their great numbers and the risk of getting stung, control of yellow jackets and hornets should be left to pest controllers.

4. Provide Educational Material with the Products. The labels on many pest control items give directions for their use; however, directions only tell how to use the products. Additional information is often needed to explain to occupants what they can do in their buildings to prevent pests from entering, and what nonchemical measures they can take to control minor pest infestations. See Appendix C for fact sheets that can be extracted, copied, and provided to self-help customers. If additional information is needed that is not contained in this Guide, then call your Major Command Pest Management Consultant or the following for help:
Pesticide Hotline (operated by the Entomological Sciences Program at the US Army Public Health Command) at DSN 584-3773 or Commercial (410) 436-3773.

5. Keep Records of Items Issued. Information on pest control items needs to be recorded on the Pest Management Maintenance Record (DD Form 1532-1) or computer equivalent database for pesticide reporting. The DD Form 1532-1 (or other record) is used to record pest control data for each building on the installation. Regardless of who does the pest control work, public works or self-help, data need to be entered. This may be done at the self-help store or by the pest controllers or Pest Management Coordinator. A list of pest control items issued to occupants needs to be forwarded to the Pest Management Coordinator (or other individual designated to compile pesticide use information) every month.

6. How to Evaluate Your Pest Control Supplies. An inventory should be taken of your self-help pest control items at least four times per year. This will show, over time, usage patterns and seasonal demands for items. It will also let you know if you have a product that is not being used. This could be due to the absence of certain pests in buildings on your installation, or it could be that potential customers do not know where to obtain self-help products. Excess products should be turned in and shortages of high-demand items need to be filled in a timely manner. Excess pesticides may be given to local pest controllers; if this is not practical, then the installation hazardous materials coordinator should be consulted.

Chapter 6

Resources

1. The resources listed below are designed to help you obtain pest management or related information to aid in your understanding of your self-help pest management program. While this listing is not all-inclusive, it represents those agencies most commonly consulted when answers to pest management questions cannot be obtained at the installation level. A list of installation personnel who may be able to provide advice and information regarding pests and pesticides can be found at the end of this chapter. Technical references on pest biology and control can be found in Appendix B.

2. Chemical Emergencies.

a. For assistance in a chemical emergency involving a spill, leak, or exposure call: **CHEMTREC**; Emergency: 1-800-424-9300, (Non-Emergency: 1-800-262-8200)

b. National Response Center for Pollution, Toxic Chemical & Oil Spills: 1-800-424-8802

c. National Pesticide Information Center: 1-800-858-7378

d. Local poison control center: (write in local number)

e. Installation spill response team: (write in local number)

3. Regulatory Advice on Self-Help Pest Management Products.

a. Army Environmental Command, Fort Sam Houston, TX, Dr. William Miller, (210) 466-1599, DSN prefix 420, email: william.b.miller54.civ@mail.mil.

b. Naval Facilities Engineering Command Atlantic, Norfolk VA, Ms. Sabra Scheffel, (757) 322-4320, DSN prefix 262, fax (757) 322-4805, e-mail: sabra.scheffel@navy.mil.

c. Air Force Civil Engineer Center, Tyndall Air Force Base, FL, Mr. Don Teig (850) 283-6465, DSN prefix 523, fax (850) 283-6219, e-mail: donald.teig.1@us.af.mil.

4. Pesticide Information/Advice.

a. DoD Pesticide Hotline: (410) 436-3773, DSN prefix 584, fax (410) 436-2037.

b. Army – Public Health Command Regions:

– PHCR-North, Fort George G. Meade, MD, (301) 677-3466, DSN prefix 622, fax (301) 677-7132.

− PHCR-South, Fort Sam Houston, TX, (210) 221-4703, DSN prefix 471, fax (210) 221-5296.

− PHCR-West, JBLM, WA, (253) 966-0084, DSN prefix 347, fax (253) 966-0163.

c. Navy – Naval Facilities Engineering Commands (NAVFACs):

− NAVFAC Atlantic, Norfolk, VA, (757) 322-4320, DSN prefix 262, fax (757) 322-4805.

− NAVFAC Pacific, Pearl Harbor, HI, (808) 472-1087, DSN prefix (315) 472 fax (808) 471-0157.

− NAVFAC Southwest, San Diego, CA 92132, (619) 532-1157, DSN prefix 522, fax (619) 532-4185.

d. Air Force – Air Force Civil Engineer Center, Tyndall Air Force Base, FL, (850) 283-6465, DSN prefix 523, fax (850) 283-6219.

5. Pest Identification.

a. Army - Public Health Command Regions (PHCRs):

− PHCR-North, Fort George G. Meade, MD, (301) 677-3466, DSN prefix 622, fax (301) 677-7132.

− PHCR-South, Fort Sam Houston, TX, (210) 221-4703, DSN prefix 471, fax (210) 221-5296.

− PHCR-West, JBLM WA, (253) 966-0084, DSN prefix 347, fax (253) 966-0163.

b. Navy:

− NECE, Naval Air Station, Box 43, Bldg 937, Jacksonville, FL, (904) 542-2424, DSN prefix 942, fax (904) 542-4324.

− NAVFAC Atlantic, Norfolk, VA, (757) 322-4320, DSN prefix 262, fax (757) 322-4320.

− NAVFAC Pacific, Pearl Harbor, HI, (808) 472-1087, DSN prefix (315) 472 fax (808) 471-0157.

− NAVFAC Southwest, San Diego, CA, (619) 532-1157, DSN prefix 262, fax (619) 532-2469.

c. Air Force:

− Air Force Institute for Operational Health (Entomology - Dr. Will Reeves), USAFSAM/PHR, Wright-Patterson AFB, OH, (937) 938-3071.

− Detachment 3, USAFSAM, Medical Entomology, PSC 80, Box 14003, APO AP 96367; Tel: +81 (98) 961-2639, DSN Phone: 315-634-2639. Located at Kadena AB, Okinawa, Japan.

d. Extension Service - Look in the "County Government" section of your local telephone directory, usually under "Extension Service" or "Agricultural Extension Service" or "University Extension Service."

6. Installation Pest Management Resources. The following points of contact on the installation may help with implementing the self-help pest management program. These individuals may be able to give advice on health and safety, environmental considerations, fire protection for the products issued, and training on self-help methods. Space is provided below to write down phone numbers and points of contact:

Preventive Medicine/Public Health
Bldg No_____
Phone _____
POC _____

Veterinary Clinic
Bldg No_____
Phone_____
POC_____

Environmental Office
Bldg No_____
Phone _____
POC _____

Pest Controllers
Bldg No_____
Phone _____
POC _____

Post Safety
Bldg No_____
Phone _____
POC _____

Industrial Hygiene
Bldg No_____
Phone _____
POC _____

Occupational Health
Bldg No_____
Phone _____
POC _____

Fire Department
Bldg No_____
Phone _____
POC _____

Pest Management Coordinator
Bldg No_____
Phone _____
POC _____

Appendix A

Pest Management Products Suitable for Issue in Self-Help Programs

1. The items listed below are considered appropriate for issue as part of self-help pest management programs; nonstandard and state-registered pesticides must be approved by the Major Command Pest Management Consultant in accordance with DODI 4150.07 and Service Component regulations. These consultants may authorize substitutions when replacement items contain the same or similar active ingredient(s) and the product meets use pattern and target pest requirements. Substitutions and specific recommendations/prohibitions should be made after consultation with the appropriate medical authority.

a. Insecticide, Fipronil, cockroach bait, regular size (Combat® Source Kill Max R1), NSN 6840-01-180-0167. 12 bait stations/box - 12 boxes/package (PG)

b. Insecticide, Fipronil, cockroach bait station, large size (Combat® Source Kill Max R2), NSN 6840-01-224-1269. 8 bait stations/box - 12 boxes/package (PG)

c. Insecticide, Fipronil (MaxForce® FC Ant Bait), NSN 6840-01-298-1122. 96 stations/package (PG)

d. Insecticide, Abemectin (Advance 360A Dual Choice® Ant Bait Stations), NSN 6840-01-543-0662. 72 stations/box (BX)

e. Insecticide, Hydramethylnon (Amdro Fire Ant Bait®), NSN 6840-01-287-3913. (24) 6-oz bottles/box (BX)

f. Insecticide, D-trans Allethrin and Resmethrin 0.125% and 0.2% respectively, aerosol (Kill Zone® House & Garden Insect Killer Formula 4) NSN 6840-01-067-2137. 14-oz can (CN)

g. Insecticide, Allethrin-Permethrin 0.25% and 0.15% respectively, aerosol (Ace House & Garden Bug Killer® 2) NSN 6840-01-586-8718. 15-oz can (CN)

h. Insecticide, Pyrethrin aerosol (PT 565 Plus XLO®), NSN 6840-00-823-7849. (12) 20-oz cans/box (BX)

i. Insecticide, Phenothrin 0.12% and Allethrin 0.129%, aerosol (Wasp Freeze Wasp and Hornet Killer®), NSN 6840-00-459-2443. (12) 17.5-oz cans/box (BX)

j. Insecticide, Etofenprox 0.50%; Tetramethrin 0.2% and Piperonyl Butoxide 1.0% (Zoecon Wasp-X Wasp and Hornet Spray®), NSN 6840-00-619-6467. (12) 16-oz cans/box (BX)

k. Herbicide, Isopropylamine salt of glyphosate, 2.0%, water soluble liquid (Roundup Ready-to-Use®), NSN 6840-01-377-7113. 24-oz pump spray bottle (BT). This product requires permission for use from the Major Command Pest Management Consultant.

l. Trap, roach (Mr. Sticky® or equivalent), NSN 3740-01-096-1632.

m. Mouse trap, Spring, Model CANTMISS®**,** WD base, w/4 way release, 4"x2"x 0.5", NSN 3740-00-252-3384.

n. Mouse Trap, Spring, Woodstream® P/N M325 or Roxide® P/N 64446, expanded trigger, NSN 3840-01-371-6770.

o. Trap, rodent, glue (Got'Cha! ®), NSN 3740-01-500-5320, box contains 24 pkg, each containing two-5 ½" x 11" glue traps.

p. Swatter, fly, NSN 3740-00-252-3383.

q. Indoor Fly Catcher Traps, P/N 444 or M500, cylindrical sticky trap, NSN 3740-01-412-9363. 12/box (BX)

r. Insect Fly Catcher, Part Number M510, NSN 3740-01-412-9371**,** 144 sticky paper strip rolls/box (BX)

2. Issue of the following items in self-help programs is prohibited.

a. Insecticide, d-Phenothrin, 2-percent aerosol, 12-ounce can, NSN 6840-01-412-4634.

b. Spring-loaded rat traps (any type).

c. Rodent baits (any type).

3. Many of the products listed are also available under similar trade names but with different stock numbers; these other products are often in unwieldy containers that may lead to waste or inappropriate use. Requisitions should be prepared to indicate that substitutions for the item requested are not acceptable.

4. Pesticides issued by self-help programs will be included in the installation's pest management reporting system.

Appendix B

Technical References

1. Bennett, G, J. Owen, and R. Corrigan, 2003. 6th ed. *Truman's Scientific Guide to Pest Control Operations*. 1997. Advanstar Communications, Inc., Cleveland, OH. 574 pp. .

2. Ebeling, W. 1978. 2nd. ed. *Urban Entomology*. University of California Press, Berkeley, CA. 695 pp.

3. Gold, R., and S. Jones (eds.) 2000. *Handbook of Household and Structural Insect Pests*. Entomological Society of America, Lanham, MD. 154 pp.

4. Hedges, S. (ed.) 2004. 9th ed. Mallis' *Handbook of Pest Control*. GIE Media, Inc., Cleveland, OH. 1397 pp.

5. Kramer, R. 1999. *PCT Technician's Handbook to the Identification and Control of Insect Pests*. 3rd ed. GIE Media, Inc., Cleveland, OH. 321 pp.

6. Olkowski, W., S. Daar, and H. Olkowski. 1993. *Common-Sense Pest Control*. Taunton Press, Newtown, CT. 416 pp.

7. Smith, E., and R. Whitman. 1992. 2nd ed. *NPMA Field Guide to Structural Pests*. National Pest Management Association, Fairfax, VA. 714 pp.

8. Triplehorn, C., and N. Johnson. 2005. 7th ed. *Borror and DeLong's Introduction to the Study of Insects*. Brooks/Cole Publishing, Inc., Belmont, CA. 864 pp.

It is recommended that these references, especially #3, 5, 6, & 7, be available in the self-help store for use by customers. Individuals seeking advice on self-help control of minor pest problems can obtain more information about pests from the information sheets contained in this Guide, as well as other pests that are not addressed in this document.

Appendix C

Self-Help Pest Management Information Sheets

Information sheets are provided for the pests listed below. These pests are those most commonly found in and around quarters and other buildings. The information contained in each sheet gives a brief description of the pests, why control is needed, and both nonchemical and chemical control measures designed to prevent, exclude, or kill the pests. The sheets are aimed at providing guidance on what the occupants can do **before** they go to the self-help store. Should these efforts fail, then information is provided on the types of products available from self-help, along with general comments on their use. The sheets can be extracted from this guide and duplicated as handouts at the self-help store. Each pest information sheet consists of two pages that can be photocopied double-sided for conciseness.

ANTS
- Household Ants
- Pharaoh Ants
- Fire Ants

COCKROACHES
- American Cockroaches
- Brown-banded Cockroaches
- German Cockroaches
- Smokybrown Cockroaches

FLYING INSECTS
- Mosquitoes
- House Flies and other Domestic Flies

CRAWLING PESTS
- Centipedes
- Millipedes
- Silverfish and Firebrats
- Pillbugs and Sowbugs
- House and Field Crickets
- Earwigs
- Scorpions
- Spiders

STINGING INSECTS
- Yellowjacket Wasps
- Paper Wasps

FOOD PESTS
- Dermestid Beetles

LICE

HOUSE MICE

FLEAS AND TICKS
- Fleas
- Ticks
- Brown Dog Ticks

Household Ants

1. Why is control needed? Ants are common household pests across the United States. With the exception of carpenter ants, most ant species cause no damage to housing structures. Ants enter a home in search of food. The presence of ants in homes, however, is disruptive to most people. In addition, some ants may bite if handled. While most ants in homes are small, carpenter ants are large, black, and 3/8 to1/2-inch long. These ants live in damp wood where they excavate the softer wood to make a nest. The presence of carpenter ants usually indicates excess dampness or leaking water. **NOTE. Carpenter ant control should be done by pest controllers, not through self-help.**

2. General Biology

What do they look like?
Ants are small, usually wingless insects. However, winged ants may be seen "swarming" at certain times during the year. Ants are 1/8 to 1/2-inch in length and can be identified by antennae that are bent like an elbow. They have a narrow "waist" between the thorax and abdomen. Depending on the species, their color may be yellow, red, brown, or black.

How do they get in?
Ants enter homes through cracks and crevices as they search for food and shelter.

Do they reproduce?
The queen of an ant colony is the only ant that lays eggs. Depending on the type of ant, as few as 15-20 eggs per year or as many as 5-20 eggs per day may be laid by queens. Whether the ants have a nest inside or outside, their numbers usually increase if left untreated.

Where do they live?
Ants generally live outdoors, but a few species may make nests inside your home. The nests are usually found behind loose baseboards, behind hollow walls, or in other protected voids.

What do they do?
Ants, in general, disrupt the household. They enter homes looking for food, and often infest kitchen pantries. Some ants inflict pain with a bite or sting. Carpenter ants weaken structures by making nests in wooden support beams in your home.

More about ants. Ants are social insects. Adult ants are the only life stage normally seen in homes. A colony of ants consists of one or more queens, workers, and males. As many as 500,000 ants may live in one colony. Males and queens are produced and emerge in the late spring or early summer when it is time for mating. Mating usually occurs in flight, after which the queen loses her wings and starts a new colony or joins an existing colony. There are many ant species that invade houses; with the exception of carpenter ants, most are small, less than 1/4 inch in length.

3. What you should do before you go to self-help or call the pest controller.

- Determine where the ants are coming from - is their nest indoors or outdoors?
- Eliminate food sources by keeping food in closed containers.
- Vacuum or sweep regularly to remove spilled food particles.
- Seal cracks, crevices, or holes that provide entry into your home with caulk, especially around pipes and utility lines.
- Correct moisture and ventilation problems.
- Inspect plants and other items before bringing them indoors.
- Move firewood, dead trees, and limbs away from the house.
- Store garbage cans in dry places; keep clean and empty often.

4. Self-Help Items

What to get; how many; and how often.
Obtain ant baits. Use 3-4 bait stations in each room where ants are seen. Use them as directed on the label.

How to determine if your efforts are working.
The number of ants should diminish. Remember to seal any outside openings where ants may be entering the building. As long as entry is provided and food is available, ants may continue to be a problem even though bait stations are in place.

5. What you should do if your control efforts do not work.

If after 30 days your control efforts are not working, call pest controllers or the Public Works' Work Order Desk.

Pharaoh Ants

1. Why is control needed? Pharaoh ant workers search actively for food and often use electrical and telephone wires as a highway. Once these ants invade a home, they are usually found year-round. In addition to disrupting the household by their presence, the ants may bite infants, especially when food, milk, or body fluids provide an attractant.

2. General Biology

What do they look like?
Workers are approximately 1/16" long. The body is often pale yellow or red with the abdomen darker.

How do they get in?
They often follow pipes, electrical lines, and telephone lines into buildings, or enter through poorly caulked windows or under flashing. Once inside, the ants move from room to room.

Do they multiply?
A queen can produce 400 eggs in her lifetime. New nests can be formed by the migration of as few as 10 immatures, 5 workers, and one queen. This process is called "budding."

Where do they live?
Pharaoh ants have a bad habit of nesting in inaccessible areas, such as behind baseboards, in wall voids or wall sockets, in furniture and appliances, under floors, and in linen. They can also nest outside; however, they do not survive outdoors during winter in northern areas of the United States.

More about pharaoh ants. Colonies consist of queens, males, workers, and brood (eggs, larvae, and pupae). Flights of swarmers seldom ever take place even though winged reproductive ants are produced. Development time from egg to adult for workers averages 38 days at 80^{o}F. A queen can live from 4-14 months, a worker lives for about 10 weeks, and males live 3-5 weeks. Pharaoh ants have many queens. More than one nest may occur inside a home, and individual ants from one nest do not fight with their counterparts from other nests.

3. What you should do before you go to self-help or call pest controllers. Baits are usually the only effective method of control. Place a bait station as close as possible to a line of foraging ants without disturbing them. Do not disturb the colonies or spray them with insecticides as this can cause them to "bud" and form new colonies in the building.

4. Self-Help Items

What to get; how many; and how often.
Get ant bait stations. Approximately one bait station/100 sq. ft. is required. Place bait stations next to ant trails and/or where ants have been seen. Replace bait stations that are empty and relocate stations that have little or no ant activity. Bait stations should be used until ants disappear. Use them as directed on the label.

How to determine if your efforts are working.
Ant activity will decrease and finally stop. Look for ant trails and ants near sources of water (sinks and faucets).

5. What you should do if your control efforts do not work.

If after 30 days your control efforts are not working, call pest controllers or the Public Works' Work Order Desk.

Fire Ants

1. Why is control needed? The most significant problem associated with fire ants is that they sting. These ants are very aggressive and will sting anything that disturbs their mounds. An unsuspecting child or adult can be at risk of receiving multiple stings. Some people are hypersensitive to the venom and can suffer nausea, chest pains, and even lapse into a coma after a single sting.

2. General Biology

What do they look like?
Imported fire ants are 1/8 to 1/4-inch in length. They are reddish brown and produce rounded, conical mounds that can be greater than 2 feet in diameter and up to 18 inches high.

How do they get in?
They enter through cracks and crevices in walls and foundations and under windows and doors.

Do they multiply?
Fire ants are social insects that can have over 200,000 individuals in a colony. Their numbers can increase rapidly.

Where do they live?
They usually live outdoors, and do especially well in high-maintenance areas. They may infest electrical boxes and air conditioners, and may cause electrical problems. They can infest walls of buildings, basements, or other undisturbed areas.

What do they do?
Fire ants have a painful sting. This sting may cause pustules, which, when broken, may result in infection. Some people are allergic to fire ant stings. These ants are also detrimental to pets, livestock, and wildlife.

More about fire ants. Fire ant colonies consist of one or more queens, winged males and females (virgin queens), workers, and brood (eggs, larvae, and pupae). Winged reproductive ants primarily leave the colony on mating flights in late spring and summer.

3. What you should do before you go to self-help or call pest controllers.

- There are really no effective cultural control methods.
- Remove trash and debris from around buildings.
- Drenching the mound with three gallons of very hot water has been recommended; however, this method has a lower success rate than chemical baits and can kill grass.

NOTE. Hot water should be used only when adequate precautions have been taken to prevent burns.

4. Self-Help Items

What to get; how many; and how often.
Ant baits containing hydramethylnon, such as Amdro®, work well. The bait can be used for individual or broadcast treatments. Use in accordance with the label. Sprinkle bait around the mound, not on top, when the ants are active. Treat each new mound. Reapply if needed in 4 to 6 weeks. Use as directed on the label.

How to determine if your efforts are working.
Fire ant activity around the mounds you have treated should disappear.

5. What you should do if your control efforts do not work.

If after 30 days your control efforts are not working, call pest controllers or the Public Works' Work Order Desk.

American Cockroaches

1. Why is control needed? Human disease-causing organisms have been found on the bodies of cockroaches and in their droppings. These organisms can be left on food and surfaces that cockroaches contact. Cockroaches are commonly associated with transmission of the bacterial food poisoning agent *Salmonella*. In addition, there have been reported cases of cockroaches gnawing the skin and nails of sleeping people. Also, some people are allergic to cockroaches; in some studies, as much as 28% of the population has shown allergic reactions to cockroaches.

2. General Biology

What do they look like?
Adult American cockroaches are approximately 1-1/2 to 2 inches in length. The adults have fully developed wings that completely cover the back end of their body. They are reddish brown in color with a yellow halo-like area on the part of the body just above the head.

How do they get in?
American cockroaches can be brought into homes in or on objects. They can enter structures through drains connected to the sewer system. They also enter at doorways that are left open or are improperly sealed. Entrance can be through cracks or voids in the walls and foundation or through the crevices or chases around utility pipes that enter your home.

Do they multiply?
The American cockroach will reproduce indoors and outdoors in warmer climates. A female will produce over 1,300 eggs in her lifetime.

Where do they live?
American cockroaches are pests throughout the United States. In the southern coastal states, as well as in southern California, this species lives and reproduces outdoors as well as indoors. Though these cockroaches are found in homes, they are more commonly found in food storage and food preparation areas, basements, and steam tunnels of bakeries, grocery stores, restaurants, and hospitals. American cockroaches are the most common cockroach found in the sewers of the United States.

What do they do?
Besides harboring human disease organisms and causing allergic reactions, American cockroaches can gnaw through thin plastic food packaging and even damage plants in greenhouses.

More about American cockroaches. Adult American cockroaches live from 200 to 400 days. The female can produce as many as 90 egg capsules (3/8-inch in length) in its lifetime. Each egg capsule has approximately 15 eggs. The young or nymphs (1/4-inch in length) emerge from the eggs in about 60 days. It takes about 30 days for the young to mature to adulthood. This is

temperature-dependent, meaning that nymphs will mature faster in warmer temperatures and slower in colder temperatures. Because of their longevity and reproductive capacity, American cockroaches can produce very large populations. As many as 5,000 American cockroaches have been collected from a single sewer manhole.

3. What you should do before you go to self-help or call the pest controller.

Since cockroaches often enter through small openings, seal the following areas:

- cracks and crevices that may harbor cockroaches, such as the crevices where countertops and kick boards meet the walls
- holes in the walls that lead into the wall void, such as around pipes
- around doors and windows
- cracks, crevices, and holes in walls and foundation

Good housekeeping and sanitation are very helpful in reducing and preventing cockroach problems. Cockroaches like to live in warm, dark, humid places where food is plentiful. Practice the following:

- Keep kitchen scraps in sealed containers.
- Clean up food and beverage spills immediately.
- Do not leave pet food out overnight.
- Vacuum your home frequently.
- Fix leaking faucets and plumbing.

4. Self-Help Items

What to get; how many; and how often.
Caulking for sealing cracks and crevices can be obtained from self-help. Get at least 3 sticky traps for each room where cockroaches are common (i.e., bathrooms, kitchens). If more than 2 American cockroaches are killed or captured in 3 nights, go to self-help and get 3-4 large cockroach bait stations per room where cockroaches were found. Adult American cockroaches are too large to enter the small bait stations. Use large bait stations as directed on the label.

How to determine if your efforts are working.
Continue to use sticky traps. Check them regularly and note what is captured. Throw the traps away after about a month. Continue to use the traps as necessary. Look for cockroaches at night just after you turn on the lights in a room. Look for egg cases, cast skins, and fecal droppings and staining. If cockroaches are trapped or signs of them are seen, continue to use the self-help items. Clean up or remove the egg cases, cast skins or droppings/stains so that fresh signs can be distinguished from old activity.

5. What you should do if your control efforts do not work.

If after 30 days your control efforts are not working, call pest controllers or the Public Works' Work Order Desk.

Brown-Banded Cockroaches

1. Why is control needed? Human disease-causing organisms have been found on the bodies of cockroaches and in their droppings. These organisms can be left on foods and surfaces that cockroaches contact. Cockroaches are commonly associated with transmission of the bacterial food poisoning agent *Salmonella*. Also, some people are allergic to cockroaches; in some studies as much as 28% of the population has shown allergic reactions to cockroaches. Brown-banded cockroaches are especially fond of eating starchy products, so they will feed on glues associated with wallpaper, postage stamps, and envelopes. Large populations may produce an unpleasant odor that may linger even after the cockroaches are gone.

3. General Biology

What do they look like?
Adult brown-banded cockroaches are 1/2 to 5/8-inches in length. These cockroaches are reddish brown to dark brown in color; they have two cross bands of lighter color, one at the base of the wings and the other about 1/3 the way down the back. The female is broader than the male; her wings do not extend to the tip of her abdomen, while the wings of the male do.

How do they get in?
Brown-banded cockroaches can be brought into homes in or on objects, such as produce boxes and grocery bags. Entrance can be through cracks or voids in the walls and foundation and from adjacent quarters. They may also enter through crevices around utility pipes.

Do they multiply?
The female cockroach can produce about 230 eggs in its lifetime, which is about 6 months.

Where do they live?
Brown-banded cockroaches live throughout the house. They can be found in places where cockroaches generally are not expected to be found. Brown-banded cockroaches like warm temperatures and can be found on closet shelves and inside and under both large and small electrical appliances. They like to hide in places above the floor, like behind pictures and wall hangings.

What do they do?
Brown-banded cockroaches are not as severe a pest as German cockroaches, but they can reach large numbers if food and water are abundant. They are not as common as German cockroaches in homes and institutional buildings, but they can be found throughout the house. They produce an unpleasant odor and will feed on food products, glues and fabrics.

More about brown-banded cockroaches. Adult brown-banded cockroaches live about 6 months. The developmental time from egg to adult is over 200 days. The female produces about 13 egg capsules in her lifetime. Each egg capsule contains 10 to 18 eggs. After a few days, the female will attach her egg capsule to objects, such as appliances or hanging pictures.

3. What you should do before you go to self-help or call pest controllers.

Since cockroaches often enter through small openings, seal the following areas:

- cracks and crevices that may harbor cockroaches, such as the crevices where countertops and kick boards meet the walls
- holes in the walls that lead into the wall void, such as around pipes
- around doors and windows
- cracks, crevices, and holes in walls and foundations

Good housekeeping and sanitation are very helpful in reducing and preventing cockroach problems. Cockroaches like to live in warm, dark, humid places where food is plentiful. Practice the following:

- Keep kitchen scraps in sealed containers.
- Clean up food and beverage spills immediately.
- Do not leave pet food out overnight.
- Vacuum your home frequently.
- Fix leaking faucets and plumbing.

4. Self-Help Items

***What to get; how many; and how often*.**
Caulking for sealing cracks and crevices can be obtained from self-help. Go to self-help and get at least 3 sticky traps for each room where cockroaches are found (i.e., bathrooms, kitchens, and utility rooms). If more than 2 cockroaches are captured in 3 nights, go to self-help and get 5 cockroach bait stations per room where cockroaches were captured. Use them as directed on the label.

How to determine if your efforts are working.
Continue to use sticky traps. Check them regularly and note what is captured. Throw the traps away after about a month. Continue to use the traps as necessary. Look for cockroaches at night just after you turn on the lights in a room. Look for egg cases, cast skins, and fecal droppings and staining. If cockroaches are trapped or signs of them are seen, continue to use the self-help items. Clean up or remove the egg cases, cast skins, or droppings/stains so that fresh signs can distinguish new cockroach activity from old activity.

5. What you should do if your control efforts do not work.

If after 30 days your control efforts are not working, call pest controllers or the Public Works' Work Order Desk.

German Cockroaches

1. Why is control needed? Human disease causing organisms have been found on the bodies of cockroaches and in their droppings. These organisms can be left on foods and surfaces that cockroaches contact. Cockroaches are commonly associated with transmission of the bacterial food poisoning agent *Salmonella*. Also, some people are allergic to cockroaches; in a given population as much as 28% of the people may have allergic reactions to cockroaches. In addition to food products, German cockroaches will feed on almost anything with nutritional value, such as soaps, glue, and toothpaste. Large populations may produce an unpleasant odor that may linger even after the cockroaches are gone.

2. General Biology

What do they look like?
Adults are about 5/8-inch long and brown, with 2 dark parallel stripes running down the pronotum, or "shoulders," of the cockroach.

How do they get in?
Cockroaches may travel from neighboring apartments or living quarters through wall voids and cracks and crevices. They may also enter in or on grocery bags, boxes, food items, and many other items brought into the home.

Do they multiply?
Yes, German cockroaches breed year-round. This species can develop from egg to adult in 36-60 days. Females produce from 4-5 egg capsules during their lifespan. Each egg capsule produces about 30 nymphs.

Where do they live?
German cockroaches live in warm, dark places. They live in walls, cabinets, and other hiding places in the kitchen and bathrooms. However, they will also live anywhere in the house where there is adequate food, water, and shelter. They may occur near house plants and pet food, or in clutter such as clothing on the floor, books, magazines, newspapers, boxes, and paper bags.

What do they do?
German cockroaches can become severe pests if food and water are abundant. They can also carry human disease-causing agents and have an unpleasant odor associated with them.

More about German cockroaches. The adult female carries her egg case until 1-2 days before hatching. The egg case is deposited in a sheltered place. Nymphs hatch from the egg case and are somewhat similar to adults except that they lack wings. Development from egg to adult ranges from about 50 to 200 days, depending on temperature and relative humidity.

3. What you should do before you go to self-help or call pest controllers.

Since cockroaches often enter through small openings, seal the following areas:

- cracks and crevices that may harbor cockroaches, such as the crevices where countertops and kick boards meet the walls
- holes in the walls that lead into the wall void, such as around pipes
- around doors and windows
- cracks, crevices, and holes in walls and foundation

Good housekeeping and sanitation are very helpful in reducing and preventing cockroach problems. Cockroaches like to live in warm, dark, humid places where food is plentiful. Practice the following:

- Keep kitchen scraps in sealed containers.
- Clean up food and beverage spills immediately.
- Do not leave pet food out overnight.
- Vacuum your home frequently.
- Fix leaking faucets and plumbing.

4. Self-Help Items

What to get; how many; how often.

For smaller infestations (less than 10 cockroaches found in one room only), get 6 small bait stations and several sticky traps. Place the sticky traps along baseboards, usually behind appliances or other objects that are not moved on a daily basis. Place the bait stations along floor/wall junctions in protected places, especially in those areas where cockroaches have been seen. Bait stations can also be placed under appliances, preferably next to the sides of the devices. For larger infestations (cockroaches found in more than one room), get 6-12 small bait stations and 6-8 sticky traps. Place the traps and bait stations as described above in each room where cockroaches have been seen. Use them as directed on the label.

How to determine if your efforts are working.

Continue to use sticky traps, check them regularly, and note what is captured. Throw the traps away after about a month, unless they are filled with cockroaches. Look for cockroaches at night just after you turn on the lights in a room. Look for egg cases, cast skins, fecal droppings, or staining. If traps are full of cockroaches and there are abundant signs described above, then you probably need to call pest controllers. Clean up or remove egg cases, cast skins, and droppings/stains in order to tell if you have new cockroach activity. If you see a reduction in the number of cockroaches, then your efforts are probably working.

5. What you should do if your control efforts do not work.

If after 30 days your control efforts are not working, call pest controllers or the Public Works' Work Order Desk.

Smokybrown Cockroaches

1. Why is control needed? Not only is their mere presence a nuisance, but they are known to be capable of carrying many common disease pathogens, as well as causing allergic reactions in many people.

2. General Biology

What do they look like?
Smokybrown cockroaches are approximately 1-1/4 inches long. Color is uniform and shining, typically brownish black but varying from dark mahogany to black. Both sexes have wings that extend beyond their abdomen. They are good fliers and are attracted to lights.

How do they get in?
Smokybrown cockroaches can be brought into homes in or on objects. They can enter structures through drains connected to the sewer system. They also enter at doorways that are left open or are improperly sealed. Entrance can be through cracks or voids in the walls or foundation or through the openings around utility pipes that enter your home.

Do they multiply?
The female can produce about 400 eggs in her lifetime.

Where do they live?
When outside, they live in holes, ivy, vines, and wood piles. Indoors they can be found in attics but tend to prefer warm and humid areas not exposed to air currents.

More about smokybrown cockroaches. The female deposits her egg case approximately one day after it is formed. The egg case is firmly glued to some object. Females produce from 4-32 egg cases in a lifetime, with each case containing 4-29 eggs. The time spent from egg to adult is about 400 days depending on humidity and temperature. An adult female can live about 250 days.

3. What you should do before you go to self-help or call pest controllers.

- Seal exterior cracks and crevices with silicone caulk, making sure all windows have tight-fitting screens in good repair.
- Change white light bulbs to yellow bulbs around entrance doors.
- Use door sweeps and screen doors.

4. Self-Help Items

What to get; how many; and how often.
Caulk for sealing cracks and crevices can be obtained from self-help. Get at least three sticky traps per room where cockroaches have been seen (bathrooms, kitchens, and utility rooms are most common). If more than two smokybrown cockroaches are caught in three nights, get 3-4 large cockroach bait stations per room where the cockroaches were captured. Use them as directed on the label. Adult smokybrown cockroaches are too large to enter small bait stations.

How to determine if your efforts are working.
Continue to use sticky traps. Check them regularly and note what is captured. Throw the traps away one month after placement in your home. Continue to use fresh traps as necessary. Look for cockroaches at night just after you turn on the lights in a room. Look for egg cases, cast skins, fecal droppings, or staining. If traps are full of cockroaches and there are abundant signs described above, then you probably need to call pest controllers. Clean up or remove egg cases, cast skins, and droppings/stains in order to tell if you have new cockroach activity. If you see a reduction in the number of cockroaches, then your efforts are probably working.

5. What you should do if your control efforts do not work.

If after 30 days your control efforts are not working, call pest controllers or the Public Work's Work Order Desk.

Mosquitoes

1. Why is control needed? Female mosquitoes are blood-sucking insects. Besides their ability to transmit numerous diseases, their presence and attempts to take blood meals can cause great annoyance to you and your family.

2. General Biology

What do they look like?
Adult mosquitoes are small, fragile, winged insects. The word mosquito is from a Spanish word meaning "little fly". Adult mosquitoes are about 3/16 to 1/4-inch in length. They have long, slender, needle-like mouthparts that they use to suck blood. Their legs are long and slender. Mosquito bodies, legs, and wings have scales on them. The larvae are legless with a bulbous thorax and a long, slender abdomen. A breathing or air tube is attached to the tail end of the abdomen. The larvae swim head downward with this air tube at the surface of the water. Mosquito pupae look very different from larvae. Like larvae, the pupae require an aquatic environment to survive. The pupae float on the surface of the water, breathing through two trumpet-like appendages attached to the head and thoracic region. A slender abdomen hangs down from the head/thorax portion of the body. Pupae move through the water by tumbling. Adults emerge from the pupae.

How do they get in?
Mosquitoes fly into homes through unscreened or open doors or windows. Mosquitoes may even breed within your quarters; some mosquitoes will breed in the pots of over-watered plants or in fish tanks. Many mosquitoes are very good fliers; their breeding sites may be several miles from your home.

Do they multiply?
Female mosquitoes produce from 50 to 500 eggs per brood and may have 8 to 10 broods in their lifetime. It is estimated that a single female mosquito and its offspring could produce 20 million mosquitoes in 10 weeks.

Where do they live?
Mosquitoes generally breed in aquatic environments outdoors. Mosquitoes will not breed in seawater, but they will breed in brackish, stagnant, and sewage-contaminated water. Mosquitoes will breed in containers that hold water, such as tires, tin cans or Styrofoam cups. The water in the breeding sites must be still or very slow moving. Mosquitoes will not breed in fast moving rivers or streams.

What do they do?
Mosquitoes cause annoyance and skin irritation due to their feeding habits. Only females feed on blood. Most important, mosquitoes transmit diseases to humans, pets, and livestock. In the United States the common mosquito-transmitted diseases are viral encephalitides.

In other parts of the world, mosquitoes transmit malaria, dengue, and yellow fever. Since some of the mosquitoes that transmit these diseases are also present in the United States, transmission could occur if the disease-causing organisms were introduced into the mosquito and human populations.

More about mosquitoes. Mosquitoes lay their eggs near or on water. When the eggs are covered with water, they hatch into larvae or "wigglers." The larvae must live in water to survive and will develop into the pupal or tumbler state. The adults will emerge from the pupae and search for a resting place to dry; they then feed and mate. The mosquito life cycle can be completed in as little as 5 days or as long as several months or maybe even a year. The length of their life cycle is temperature and species dependent. Cooler temperatures extend the time necessary to complete the life cycle. Some mosquito eggs will not hatch immediately; they are capable of hatching as long as 5 years after they were laid.

3. What you should do before you go to self-help or call the pest controller.

- Since mosquitoes may breed in any container that will hold water, empty the water out of any containers that are holding water in your yard.
- Change the water in birdbaths every couple of days.
- Discard any unwanted containers in your yard that could become mosquito breeding sites. Don't forget to check children's swimming pools.
- Make sure windows and doors are screened and not left open.
- In most cases, there is little a homeowner can do to control mosquitoes because large numbers may fly from breeding sites outside of the neighborhood.

4. Self-Help Items

What to get; how many; and how often.
Get one or two fly swatters from self-help for the mosquitoes that get into the house. An aerosol spray can also be used for occasional mosquitoes that get in. Use the spray as directed on the label.

How to determine if your efforts are working.
If you get 25 or more mosquitoes on you within one minute when you are outdoors you should call the pest controllers or your local preventive medicine section. If you continue to see mosquitoes indoors, re-check to make sure windows and doors are screened or closed as much as possible.

5. WHAT TO DO IF YOUR CONTROL EFFORTS DO NOT WORK.
Call pest controllers or the Public Works' Work Order Desk for assistance. They may be able to find the source of the mosquitoes and conduct appropriate control measures.

House Flies and Other Domestic Flies

1. Why is control needed? Besides the annoyance they create due to their presence, these flies are involved in the transmission of several human and animal diseases. Stable flies can inflict painful bites.

2. General Biology

What do they look like?
These flies are from 3/16 to 1/2-inch long and have two wings. They have large compound eyes and short antennae. Their bodies are usually striped and the color varies from light gray to metallic shades of green, blue, and blue-green. They have sponging mouthparts except for the stable fly, which has piercing-sucking mouthparts that it uses to suck blood.

How do they get in?
House flies and other domestic flies may fly into homes through open doors and windows. In some cases they may crawl in through holes, cracks, and crevices.

Do they multiply?
Domestic flies will lay about 500 eggs in their lifetime. It is theorized that if all the offspring of a single female house fly survived and reproduced, in five months there would be approximately 191,010,000,000,000,000,000 flies. Flies will not usually breed in the house unless garbage is present for more than one week or there is a dead animal in an attic, crawl space, or other area.

Where do they live?
Domestic flies generally reproduce outdoors, but they will readily enter homes and buildings in search of food, moisture and shelter. If there is suitable decaying organic material available, they will reproduce indoors.

What do they do?
House flies and other domestic flies have been proven to transmit disease-causing bacteria, protozoa, viruses, worms, fungi, and rickettsia. Flies have been well documented as transmitters of the food-poisoning agents of *Staphylococcus aureus*, *Salmonella* serotype Enteritidis, and *Escherichia coli* (commonly referred to as *E. coli*).

More about flies. Domestic flies are those flies that are commonly found in close association with humans and the animals associated with humans. The most common of these flies are: **house fly, little house fly, face fly, blow or bottle fly, flesh fly, and stable fly.** The life cycle of these flies is generally completed in 1 to 4 weeks. This developmental time is dependent on the specific fly and weather conditions. The eggs of these flies are laid on moist decaying animal or plant material. The females general lay about 150 eggs at a time. Legless white carrot-shaped larvae (maggots) hatch from these eggs and feed on the decaying animal or plant material. Larvae will develop into pupae in about 7 to 14 days. Adults will emerge in three or more days.

3. What you should do before you go to self-help or call pest controllers.

- Make sure windows are screened.
- Do not leave unscreened doors and windows open.
- Make sure garbage is sealed in plastic bags.
- Pick up pet feces, seal them in a plastic bag, and dispose of them with other household garbage and trash.

4. Self-Help Items

What to get; how many; and how often.
Fly swatters can be used for minor problems; a can of aerosol insecticide can be used if flies are present in large numbers. Sticky fly strips can also be obtained from self-help. Use one or two strips per covered porch area or room. Do not place strips in the kitchen or food preparation areas. NOTE. Keep in mind that an occasional fly in a home is not out of the ordinary, but continual fly problems are not normal. For serious fly control, sanitation and exclusion should be used.

How to determine if your efforts are working.
Fly strips can be used to help determine the extent of your fly problem. If you keep openings screened or closed and there are large numbers of flies on the outside of your quarters, then call pest controllers or Preventive Medicine for help.

5. What you should do if your control efforts do not work.

Call the pest controller or the Public Works' Work Order Desk for assistance. They may be able to find the source of the domestic flies and conduct appropriate control measures.

Yellowjacket Wasps

1. Why is control needed? Yellowjackets can inflict multiple painful stings. They are a particular problem when they are attracted to the food and beverages we consume, resulting in stings around the face, throat and neck, or even the mouth.

2. General Biology

What do they look like?
Yellowjackets are thick-bodied, black and yellow striped wasps about 1/2 to 3/4-inch long. They have 2 pairs of wings and are good fliers.

How do they get in?
Yellowjackets are attracted to the food we eat, especially late in the summer. They enter houses through open doors and windows but may also be present in large numbers on the outside of the house.

Do they multiply?
In the fall, only the queen survives. The queen begins a new colony in the spring and lays eggs until midsummer. At its peak, a yellowjacket colony may contain several thousand wasps. These insects do not usually multiply in the house. However, if yellowjackets are continually seen inside, then they may be coming from a nest located in a wall void.

Where do they live?
The yellowjacket queen uses a pre-existing cavity in loose soil and prepares paper cells that house the eggs, larvae, and pupae. When the pupae hatch, sterile females make more cells and tend the eggs and young wasps. Eventually, the colony may reach 1 foot in diameter and consist of thousands of paper cells. The nests are rarely seen; the only way to tell if there is a yellowjacket nest in your yard or house is to see adult wasps flying in and out of a small hole on the surface of the ground or a crack leading into the building. Some yellowjackets make nests under eaves or other protected areas on the outside of buildings.

What do they do?
Yellowjackets do not usually bother humans except when the nest is disturbed or they are accidentally touched during the late summer. The nests may be hard to find, but if disturbed, then hundreds of wasps may seek the attacker. This is common when nests are in the ground under vines, shrubs, or other vegetation. Toward late summer, the food source for the wasps changes from protein to sweets. The adult wasps are more aggressive at this time and seem to easily find humans, especially at picnics or other outdoor activities where food and drinks are available. The wasps can sting repeatedly and may cause allergic reactions in some people.

More about yellowjacket wasps. Yellowjacket wasps are social insects. Adult wasps are the only life stage normally seen in and around homes. A yellowjacket colony consists of a queen, workers, and males. Males and queens are produced late in the summer and the new queens emerge to hibernate over the winter; the rest of the colony dies. The new queen begins a new colony in the late spring and the cycle starts again.

3. What you should do before you go to self-help or call pest controllers.

- Try to find nests in your yard if you see increasing numbers of yellowjackets.
- Look for workers returning to the nest around dusk.
- If you find a nest, call the pest controllers.
- Keep windows and doors screened or closed to exclude wasps.
- Do not take food and beverages outdoors, especially in late summer - this applies particularly to children who may not be aware of the dangers posed by the wasps.
- Keep garbage in tightly sealed bags away from the house.

4. SELF-HELP ITEMS.

What to get; how many; and how often.
Fly swatters and aerosol pyrethroid insecticide may be used to kill yellowjackets indoors. Wasp freeze is only to be used to kill wasps outdoors and should never be used indoors. Because of the large numbers of wasps in a nest, use of wasp freeze on yellowjacket nests, even though you know where the entrance is, should not be performed by occupants - call pest controllers for this type of control.

How to determine if your efforts are working.
Good sanitation should help to reduce the attraction for yellowjackets. If these wasps are persistent pests, call pest controllers - you may have a nest in your yard.

5. What you should do if your control efforts do not work.

If you can't keep the wasps out of your house, call pest controllers or the Public Works' Work Order Desk.

Paper Wasps

1. Why is control needed? Paper wasps can inflict multiple painful stings. They are a particular problem when their nests are attached to the house near entry doors, porches, or other areas where people frequently congregate. If these wasps get into the house, their movements in trying to escape usually disrupt the household.

2. General Biology

What do they look like?
Paper wasps are thin-waisted insects that are commonly red to yellowish in color with black stripes, but may also be dark brown to black. The adult wasps are 3/4 to 1 inch long. They have 2 pairs of wings and are good fliers.

How do they get in?
Paper wasps get inside the house by accident, usually through open doors and windows.

Do they multiply?
Each nest contains less than 100 wasps. There never appear to be large numbers of wasps at the nest, and, unless the nest is near a door or porch, they are hardly noticed. They do not multiply indoors.

Where do they live?
Paper wasp nests, as mentioned before, can often be found attached to the outside of houses or other structures. The wasps feed on insects and rarely bother people.

What do they do?
The wasps forage for food and return to the nest at night. They seldom encounter people except when the nest is disturbed. If the wasps get indoors, they tend to go to light sources, windows in particular, to try to get back outside.

More about paper wasps. Paper wasps are often found in small nests made of paper which resemble an inverted umbrella. Cells, seen on the bottom of the nest, are the chambers used to rear larvae and pupae. Adults emerge from the cells and begin to feed on insects. These wasps are docile and rarely sting, although they are capable of inflicting pain if handled or accidentally crushed. Unlike yellowjacket wasps or hornets that may have nests of adults numbering in the thousands, paper wasp nests rarely support more than 50-75 adults. Their close relatives, the mud dauber wasps, can also build nests on the outside of houses, but these nests are constructed of mud, are cylindrical in shape, and rarely contain more than several wasps.

3. What you should do before you go to self-help or call pest controllers. Knock down nests as they are formed, since there will be very few wasps in the vicinity. A broom or garden hose works well.

4. Self-Help Items

What to get; how many; and how often.
Fly swatters and aerosol pyrethroid insecticides may be used to kill paper wasps indoors. Wasp freeze is only to be used to kill wasps outdoors; it should never be used indoors. Wasp freeze can be used on nests outdoors. Read the label carefully. This product provides a stream of insecticide that should kill the wasps while keeping you a safe distance from the nest. If you feel uncomfortable in spraying the nest yourself, call the pest controllers. While aerosol pyrethroid insecticides (other than wasp freeze) will kill wasps on their nest, these products are not designed to keep you at a safe distance when applying the spray.

How to determine if your efforts are working.
If you spray the nests with wasp freeze, there should be no more live wasps. Check the outside of the house for new nests and try nonchemical methods to prevent nesting before using an insecticide.

5. What you should do if your control efforts do not work.

If you can't keep the wasps out of your house, call pest controllers or the Public Works' Work Order Desk.

Dermestid Beetles and Grain Moths
(Stored Food Pests)

1. Why is control needed? Dermestids and moths can destroy and contaminate vegetable and animal products, including food products and pet food.

2. General Biology

What do they look like?
Adult dermestids are small, hard-shelled, oval beetles. They are about 1/8-inch in length and have hairy or scaly bodies. The larvae are brownish, covered with long hairs, and taper from the head to the tail end (carrot shaped). Adult grain moths are 1/4 to 1/2-inch in length and may be gray or grayish white with a reddish brown head and thorax, depending on the species. The larvae are worm-like, and about ½ -inch long. Webbing may be found in infested food.

How do they get in?
Dermestids are small. Besides entering through open doors and windows, they are good fliers and can easily enter homes through cracks and crevices. The adults feed on pollen, so they may be attracted to flowers near your home. Grain moths are usually brought into the home in infested food items.

Do they multiply?
Both dermestid beetles and grain moths will readily breed and multiply in infested food items.

Where do they live?
Dermestids and grain moths are found throughout the United States and worldwide. They are scavengers and generally live outdoors. They enter homes and structures in search of a food source. Infestations in homes can usually be found in fabrics, carpets, or food products.

What do they do?
Dermestids feed on a variety of plant and animal products. The larvae cause almost all of the damage; they feed on leather, woolen products, silk materials, linen, cotton products, furs, feathers, museum specimens, and stored food products. Moths are chiefly a problem because they leave clumps of webbing in food items.

More about dermestid beetles. Several different species of beetles are called dermestids. Dermestids are commonly called carpet or skin beetles. The dermestid life cycle, depending on the species, varies from about 1/2 to over 2 years. Adults live from 1/2 to 2 months. The larval stage may last from several months to almost 2 years.

3. What you should do before you go to self-help or call pest controllers.

Sanitation is the key to dermestid beetle and grain moth prevention and control, so follow the practices below:

- Vacuum and or sweep regularly.
- Furs and woolen products should be brushed, sunned or dry-cleaned regularly.
- Clean garments that are potential food sources should be stored in tightly sealed containers.
- Keep food items in sealed containers.
- If food items are infested, seal them in a garbage bag and discard them.

Determine if you have an infestation by looking for the following:

- Adults are attracted to windows; check window ledges and window sills for live or dead dermestids and moths.
- Look for adults crawling or flying about the house, then try to locate the source or the location of the infestations. Infested items should be cleaned or discarded. This will generally solve the problem.
- Check old packages of food for the presence of larvae or adults. If the package is unopened, check for small holes that may indicate penetration by the insects.
- Check dog and cat food for larvae and beetles since pet foods may often be the original source of the infestation.
- If beetles are infesting carpets, clothing or furniture, you may be able to place these items outdoors (or in an unheated garage or other structure) if the temperature is below freezing. This may not be practical in all locations but may offer an alternative to pesticide use to eliminate the infestation.

4. Self-Help Items

What to get; how many; and how often.
Self-help does not have any products that will help you control dermestids or grain moths. Sanitation and good housekeeping are generally the best solution. Sticky traps may be used to help detect beetles and moths. Place 2-3 traps in each room where beetles have been found.

How to determine if your efforts are working.
Look for adult and larval dermestids and grain moths crawling about your house. Look for new infestations and/or damage. Even if you find an infested product and throw it away, you may still see beetles that have escaped from the package. If after 30 days you continue to see the same number of beetles or moths, then you may not have found all of the sources of infestation.

5. WHAT YOU SHOULD DO IF YOUR CONTROL EFFORTS DO NOT WORK.
In some cases infestations may be too large or may be in a carpet or piece of furniture you want to save. If this is true, a professional application of pesticide may be required. Call pest controllers or the Public Works' Work Order Desk

Centipedes

1. Why is control needed? Centipedes have poisonous bites that are capable of causing pain similar to a wasp's sting.

2. General Biology

What do they look like?
Centipedes are elongated, flattened, and multi-segmented animals. They have one pair of legs per segment and a pair of poison jaws on the underside of the first segment. They are fast runners.

How do they get in?
Centipedes enter through cracks and crevices in the foundation of the building and under doors.

Do they multiply?
The house centipede will multiply inside, while the other types of centipedes do not.

Where do they live?
They usually are outside in dark, damp places, such as beneath leaves, stones, and boards. Inside, they are nocturnal and live in dark, humid areas such as basements, closets, and bathrooms.

What do they do?
Centipedes are usually accidental invaders. They feed on insects and spiders, but their presence inside houses is usually disturbing to the occupants. Centipedes may inflict a painful bite if handled.

More about centipedes. Centipedes lay between 15 and 55 eggs in the soil. The eggs and young are guarded by the female. They mature in three years and can live up to three years after that.

3. What you should do before you go to self-help or call pest controllers.

- Move old boards, boxes, woodpiles, compost, mulch, and similar items away from the building.
- Make sure there are no openings under doors that lead to the outside.
- If gaps exist, install weather stripping or call in a work order to have the gap eliminated. Reduction of gaps under outer doors not only keeps out pests, but also makes the quarters more energy-efficient.
- Centipedes can be swept up or removed with a vacuum cleaner.

4. Self-Help Items

What to get; how many; and how often.
Get several sticky traps (the same kind used for cockroaches) and one aerosol insecticide can. Place sticky traps on each side of each door leading to the outside. This may capture centipedes and other pests that may be coming in from the outside. If more than several pests are caught in a short period of time (e.g., several days), then pest controllers should be called. Make sure you keep the sticky traps with the pests to help the pest controllers in identifying what the problem is. You can use the aerosol insecticide, after reading the directions on the label, to kill occasional centipedes that you find in your quarters. Spray the centipede directly, pick it up with a tissue or paper towel after it has died, and throw it away. If you don't catch many pests in the traps (more than one or two), then the aerosol can should be kept on hand for occasional control of centipedes, spiders, or crawling insects.

How to determine if your efforts are working.
There should be a reduction in the numbers of the centipedes entering the home.

5. What you should do it your control efforts do not work.

If after 30 days your control efforts are not working, call pest controllers or the Public Works' Work Order Desk.

Millipedes

1. Why is control needed? Millipedes may become pests when numbers become too high and they begin to invade the building. Many species of millipedes are capable of producing an unpleasant odor when disturbed. Control is seldom needed and is usually not recommended.

2. General Biology

What do they look like?
Millipedes range from about 1/16 to 4-inches in length. They are worm-like and rounded with many segments. There are two pairs of legs per segment, except for the first three, which only have one pair per segment.

How do they get in?
They enter through cracks and crevices in walls and the foundation. They are usually found on the first floor or in the basement. Populations of millipedes often develop in mulch and thatch around buildings. They also may enter after rains or during cold weather.

Do they multiply?
Yes, they multiply primarily outside. The female lays 20-300 eggs in a lifetime.

Where do they live?
Millipedes live and reproduce outdoors. They live in sheltered areas with plenty of moisture and decaying vegetable matter, under rocks, flower pots, boards, in mulch, thatch, leaves, and soil with high organic content.

What do they do?
Millipedes feed on decaying organic matter. They do not feed on materials in the house. Some millipedes give off a foul-smelling fluid that may cause blisters on the skin. They are accidental invaders of your home.

More about millipedes. Millipedes have 7 to 8 stages from young to adult. Eggs are laid in the soil. There is usually one generation a year, though an individual may live for several years.

3. What you should do before you go to self-help or call pest controllers.

- Remove dead leaves, grass clippings, debris, and compost away from the house.
- Mow your lawn to make the environment around your quarters less suitable for millipedes.
- Water the lawn in the morning so that it will dry out during the day.
- When millipedes enter a building, pick them up in a dustpan or use a vacuum.

4. Self-Help Items

What to get; how many; and how often.
If large numbers of millipedes are found indoors, caulk or seal external openings that may provide entry. Get two sticky traps for each site that is suspected of providing entry. Monitor the traps and relocate them if millipedes are still seen but have not been captured in the traps. By using this method, you will probably find out where the millipedes are getting in.

How to determine if your efforts are working. There should be a reduction in the number of millipedes entering the home. If you still have problems after 30 days, then you probably have not found all of the entry points. If you keep catching low numbers of millipedes, then replace the sticky traps every 30 days to determine if you are truly catching additional pests.

5. What you should do if your control efforts do not work.

If after 30 days your control efforts are not working, call pest controllers or the Public Works' Work Order Desk.

Silverfish and Firebrats

1. Why is control needed? Silverfish and firebrats damage organic fabrics (except for wool and silk), books, and other paper products; they will also infest flour, rolled oats, and dried meats.

2. General Biology

What do they look like?
Silverfish and firebrats are similar in appearance. They are wingless, fast-moving insects that are about one inch long. They are flattened from top to bottom and their bodies taper from their heads to their tails, having a carrot-like shape. Their bodies have 3 long tail projections and 2 long antennae, and they are covered with fine silver to brown colored scales (firebrats are much darker in color than silverfish).

How do they get in?
Silverfish and firebrats are common household insects that readily invade homes. They can be brought into the home with furniture, old books and papers, foodstuffs, and firewood. Silverfish and firebrats can also enter homes from the outside through the crevices or spaces around doors, windows, and pipes that enter the home.

Do they multiply?
One adult silverfish or firebrat may have from 1,000 to 3,000 offspring in its lifetime.

Where do they live?
Silverfish and firebrats can be found throughout the home, from the attic to the basement. They prefer dark, warm, humid places to live, but firebrats prefer areas with higher temperatures and humidity than silverfish. Because of this, firebrats are found near heat sources like ovens, heating pipes, and fireplaces. Most silverfish and firebrats are found outdoors, living in wood piles and debris left near your home.

What do they do?
Silverfish and firebrats are fast-moving insects that are active at night. They destroy paper, animal, and vegetable products. They feed on flour, starch, sugar, gum, and glue. Wallpaper can become detached from the wall because the substance holding the paper was eaten away by silverfish or firebrats. They will also infest and destroy dried beef and breakfast cereals. They can, in some cases, live as long as a year without food. Due to their persistence and generalized feeding habits, sanitation is of little value in controlling these pests. However, removal of bags, boxes, stacks of paper, and other items will reduce harborage for these pests.

More about silverfish and firebrats. Silverfish and firebrats hatch from their eggs resembling small adults. They are only 1/20 of an inch in length. Under favorable conditions, the young will mature to adulthood in a few months, but under not so favorable conditions it may take 2-3 years. Silverfish and firebrats may live as long as 8 years.

3. What you should do before you go to self-help or call the pest controller.

- Check used furniture, old books, paper products, and foodstuffs that may harbor silverfish and firebrats before bringing them into your house.
- Do not bring infested objects into the home until the infestations have been removed.
- Small objects can be placed in the freezer for three or more days to kill these insects.
- Objects such as foodstuffs can be discarded.
- Keep foodstuffs such as cereals and dried beef in sealed containers or in the refrigerator.
- Seal openings around doors and windows to prevent entry from the outdoors.
- Seal cracks and crevices around utility pipes that enter your home.

4. Self-Help Items

What to get; how many; and how often.
Caulks for sealing cracks and crevices can be obtained from self-help. A can of aerosol spray insecticide can be obtained for the control of infested objects. Sticky traps can be used to determine the extent of the silverfish or firebrat problem. Get and place at least three sticky traps for each room of your home where silverfish or firebrats have been observed.

How to determine if your efforts are working.
Continue to use sticky traps. Place the traps near books, other potential food sources, and sites where silverfish or firebrats are observed. Check the traps regularly and note what is captured. Throw the traps away after about a month. Replace them with new traps as needed. You should see a reduction of insects caught in the traps. If you continue to have the same level of infestation after 30 days, then your efforts are probably not going to control these pests.

5. What you should do if your control efforts do not work.

If after 30 days your control efforts are not working, call pest controllers or the Public Works' Work Order Desk.

Pillbugs and Sowbugs

1. Why is control needed? They can be a nuisance if large numbers are present.

2. General Biology

What do they look like?
Pillbugs and sowbugs are crustaceans, not insects, and are similar in appearance. They are convex above and flat underneath. They are never more than 3/4-inch long. The head and abdomen are small, but the thorax is large, made up of 7 overlapping plates. They have 7 pairs of legs. Children often call these creatures "rolly-pollies."

How do they get in?
They enter through cracks in the foundation, under doors, and under windows.

Do they multiply?
They generally multiply outdoors in decaying organic matter. The female may produce over 500 offspring in a lifetime.

Where do they live?
Pillbugs and sowbugs live in damp, decaying organic matter, such as leaves, grass clippings, mulch, under rocks, and in woodpiles.

What do they do?
They cause no damage indoors other than being a nuisance.

More about pillbugs and sowbugs. Eggs are carried in a brood pouch on the underside of the female's body. Each brood contains between 7 and 200 eggs. The eggs hatch in 3 to 7 weeks. The young then remain in the pouch for 6 to 7 weeks. They may produce 2 or more broods a year. The young look like smaller versions of the adults. They can live up to 3 years.

3. What you should do before you go to self-help or call pest controllers.

- Mechanical control such as a broom and dustpan or a fly swatter may be adequate.
- Eliminate hiding places, food material and moisture sources to reduce the infestation. Source reduction will have a dramatic effect on populations.
- Pick up grass clippings, leaves, and fallen fruit and dispose in the trash or a compost pile.
- Store boards, boxes, and other debris off the ground and away from the house.

4. Self-Help Items

What to get; how many; how often.
If large numbers of pillbugs or sowbugs are found indoors, caulk or seal external openings that may provide entry. Get two sticky traps for each site that is suspected of providing entry. Monitor the traps and relocate them if the pests are still seen but have not been captured in the traps. By using this method, you will probably find out where the pillbugs and sowbugs are entering.

How to determine if your efforts are working.
There should be a reduction in the numbers of the pillbugs and sowbugs entering the home. If you still have problems after 30 days, then you probably have not found all of the entry points. If you keep catching low numbers of pillbugs and sowbugs, replace the sticky traps every 30 days to determine if you are truly catching additional pests.

5. What you should do if your control efforts do not work.

If after 30 days your control efforts are not working, call pest controllers or the Public Works' Work Order Desk.

House and Field Crickets

1. Why control is needed? The adult males produce an annoying chirping noise. They can cause damage to fabrics of cotton, silk, and wool, as well as to wood, nylon, and plastics.

2. General Biology

What do they look like?
House and field crickets are 1/2 to 1-1/4 inches long. Field crickets are generally jet black in color. The house cricket is generally yellowish brown in color.

How do they get in?
They enter through cracks and crevices in walls and foundations as well as through spaces or gaps around windows and doors.

Do they multiply?
Crickets may lay from 150 to almost 1,000 eggs in their lifetime. They can greatly increase in numbers outside.

Where do they live?
House crickets are capable of completing their entire life cycle indoors. During warm weather, house crickets prefer to live outside, but they invade homes during the cooler seasons. House crickets are found outdoors in litter, debris, and garbage dumps. Inside, they prefer dark areas behind furniture, boxes, or other objects on floors. Field crickets do not complete their life cycle indoors, and usually invade homes late in the summer.

What do they do?
Crickets can be annoying and disrupt sleep at night. The presence of insects inside the house can also be disturbing. Crickets can damage property, food, and the clothing on which they feed.

More about crickets. The nymphs of house and field crickets are very similar in appearance to adults except that they lack wings. House crickets mature to adults in about 60 days, while field crickets take about 90 days. Outdoors, the house cricket has one generation per year, while the field cricket may have up to three generations.

3. What you should do before you go to self-help or call the pest controller.

- Mow lawns and weeds around the house.
- Limit outdoor lights and use yellow bulbs.
- Keep dryer vents closed when not in operation, caulk basement window frames and pipe entrances, and move firewood away from the house.
- Elevate garbage cans off the ground on bricks or similar objects.
- Keep garden equipment and other objects away from the house to reduce harborage.
- Occasional crickets inside the house may be eliminated by vacuuming to remove them.

4. Self-Help Items

What to get; how many; and how often.
Get several insect sticky traps and a can of aerosol insecticide. Set the sticky traps along baseboards where crickets have been seen or heard. If crickets continue to be caught, place sticky traps on the inside next to outer door entrances to determine if they are coming in from outside. Use an aerosol only if numerous crickets are found and are not being controlled with the sticky traps.

How to determine if your efforts are working. You should see (or hear) a reduction in the number of crickets. The presence of crickets on sticky traps indicates that you have reduced the problem. If you continue to capture crickets on the sticky traps for more than one or two weeks, then you may have a bigger problem than self-help is designed for.

5. What you should do if your control efforts do not work.

If after 30 days your control efforts are not working, call pest controllers or the Public Works' Work Order Desk.

Earwigs

1. Why is control needed? Earwigs are a nuisance and disrupt the household. As scavengers, they may cause damage to plants. When handled, earwigs may pinch the skin which usually causes more fear than pain. Earwigs do not cause any disease or structural damage.

2. General Biology

What do they look like?
Adults are generally dark brown with red heads and yellow-brown legs. Earwigs have elongated bodies about 5/8-inch in length. They are readily identified by the pincer-like appendages on their abdomen. Most earwigs are from 1/2 to 1 inch in length. Because of their general shape and color, earwigs are often confused with cockroaches.

How do they get in?
Earwigs are accidental invaders. They usually enter homes when seeking shelter. Earwigs may enter your home when items left outdoors (plants, lawn furniture, children's toys) are brought indoors, or may enter through cracks and crevices around doors, windows, and foundations.

Do they multiply?
Earwigs lay over 100 eggs in their lifetime. The female usually lays two or more batches of eggs. Young emerge in the spring.

Where do they live?
Earwigs are outdoor nocturnal insects that prefer to hide in cracks, crevices, under bark, and in damp places. They eat dead/decaying matter and occasionally plant material.

What do they do?
Earwigs often disrupt the household because of their shape and color. Some people fear these insects because of the pincer-like appendages on the abdomen.

More about earwigs. The eggs of earwigs are laid in debris, under stones or boards, or in burrows in the ground. The female protects the eggs and nymphs in a nest-like depression. Eggs hatch in 20-72 days, depending on the season. The nymphs mature into adults in about 68 days. Adult females may live as long as 7 months. Earwigs overwinter as adults.

3. What you should do before you go to self-help or call pest controllers.

- Removing the insect from the home usually can solve the problem.
- Clean up leaf litter, vegetation, and debris from around the house to reduce earwig habitats.
- If large numbers of earwigs are present, and the area of the home is damp, a dehumidifier can reduce a minor amount of moisture in the area, but is not effective at drying up large, wet areas.

4. Self-Help Items

What to get; how many; and how often.
If large numbers of earwigs are found, obtain caulking material from self-help and fill in cracks, crevices, or holes where earwigs are entering. Sticky traps placed inside next to outer door entrances may help to catch the insects as they enter. Vacuuming or crushing the insects with a paper towel works well at eliminating small numbers of earwigs. An aerosol pesticide may also be used to kill the insects. If sticky traps are used, keep them on hand until the problem is solved or you can call pest controllers - captured insects on the sticky traps will help pest controllers identify your problem.

How to determine if your efforts are working.
Sticky traps may be placed around caulked areas and monitored regularly for earwigs. A reduction or absence of newly caught insects may indicate control success.

5. What you should do if your control efforts do not work.

If after 30 days your control efforts are not working, call pest controllers or the Public Works' Work Order Desk.

Scorpions

1. Why is control needed? Scorpions are common throughout the southern and southwestern United States from the Atlantic to the Pacific. Scorpions will enter houses and are most commonly found in crawl spaces, basements, attics, kitchens, washrooms, bathrooms, and closets. They are poisonous, though their sting is usually no worse than a wasp's sting. There is only one deadly species in the United States, the sculptured or bark scorpion. It is usually found in Arizona, but may also be found in southeastern California and western New Mexico.

2. General Biology

What do they look like?
Scorpions have 8 legs with broad, flat bodies and a segmented, slender, stinger-tipped tail. Besides the 8 legs, they have a pair of large pinchers at the front of their bodies. Their color can range from mustard yellow to black; most are a mottled or striped brownish tan. Adult scorpions will vary in length from 2 to 5 inches, depending on the species; most are about 2 to 2 ½ inches in length. Scorpions are very closely related to spiders, ticks, and insects.

How do they get in?
Scorpions enter homes through openings under and around doors and windows; through cracks and holes in foundations, floors, and walls; and wall voids. A 1/16-inch opening is all that is needed. They can also be carried into a home on or in something, such as firewood.

Do they multiply?
Scorpions, in most cases, reproduce outdoors, though young may be brought into the house on the female scorpion's back. A single female may produce 60 or more offspring in her lifetime.

Where do they live?
Scorpions live outdoors. They feed on insects and other small animals, including rodents. They are active at night, seeking prey in open places, and hiding during the day under stones, fallen trees, boards, and piles of lumber or debris. Some burrow in sand and loose soil, others will even climb trees and shrubs in search of prey. Scorpions are referred to as occasional invader pests. They will occasionally enter houses and buildings in search of water or prey.

What do they do?
Scorpions will sting when crushed, touched, or startled. During the day they will hide in dark places such as in shoes, between blankets and sheets, in drawers, and in closets. Outdoors, they may even burrow into the sand in your children's sandbox.

More about scorpions. A female scorpion will give birth to an average of 32 live young per brood. She may have 2 or more broods in her lifetime. The young are carried on her back for 5 to 15 days. These young will mature to adults in over a year. The adults may live as long as 4 years.

3. What you should do before you go to self-help or call the pest controller.

- Scorpions can be crushed with or under a hard object, such as a broom, a thick-soled shoe or boot, or a rolled up newspaper or magazine. Never use your bare feet or hands.
- Search your house for possible places of entry, such as cracks under and around doors and windows, and holes in the floor or walls.
- Fill cracks or holes 1/16 inch wide or greater to prevent scorpions from entering.

5. Self-Help Items

***What to get; how many; and how often*.**
Get at least three sticky traps for each room where scorpions have been seen. If more than three scorpions are captured per night, call the pest controller. If the number of scorpions captured or observed is less than three per night, an aerosol container of insecticide can be obtained from self-help. Use it as directed on the label. The aerosol will kill the scorpion, if it is sprayed directly, but will not leave a residual to kill other scorpions at a later time.

***How to determine if your efforts are working*.**
Continue to use sticky traps. Check them regularly and note what is captured. Throw the traps away after about a month. Replace them with new traps as needed. If you continue to see scorpions, then you probably need to have a professional evaluation of your problem.

5. What You Should Do If Your Control Efforts Do Not Work.

If after 30 days your control efforts are not working, call pest controllers or the Public Works' Work Order Desk.

Spiders

1. Why is control needed? Spiders are a general household nuisance; they leave unsightly webs and droppings on walls, countertops, and other surfaces. Some spider bites may trigger allergic reactions in humans. Other spiders, like the black widow and brown recluse, are poisonous.

2. General Biology

What do they look like?
Spiders come in various sizes, shapes, and colors. Spiders differ from insects in that they have 8 legs as compared to 6. The body of a spider is composed of 2 parts whereas insect bodies are composed of 3 separate parts.

How do they get in?
Spiders can be found around the outside of houses where insects congregate (i.e., outdoor lights, window sills). They often enter homes through cracks, crevices, and holes in walls and foundations, through open doors and unscreened windows, or may be brought in on toys, pets, or other objects.

Do they multiply?
In one spider egg case, there may be several hundred eggs. A female spider can produce several egg cases in her lifetime. Young spiders begin development in the egg sac. After emerging, they begin to grow and complete 5-12 molts, depending on the species, before reaching adulthood. The typical spider lives for approximately one year.

Where do they live?
Spiders can live in many different habitats. They tend to gather where insects are found.

What do they do?
Spiders feed on insects and other pests, making them beneficial. Insects are their primary food source. In order to kill their prey, spiders inject toxic venom. With a few exceptions, this venom is not harmful to humans or other animals. Spiders bite humans when provoked or accidentally touched.

More about spiders. Spiders are abundant and can be found in many different habitats, including water. They develop throughout the warmer seasons, and as juveniles and adults they seek shelter during the cooler weather. Depending on the species, spiders range in size from 1/16 to 3-1/2 inches long.

3. What you should do before you go to self-help or call pest controllers.

- Remove the spider from the home (kill it, vacuum it up, or capture and release outdoors).
- Regularly clean areas where spiders may be found.
- Remove insects and spider webs from window sills, door frames, and outside light fixtures.

4. Self-Help Items.

What to get; how many; and how often.
Sticky traps, placed in areas where spiders are seen, may help to solve the problem. Fly swatters can be used to kill spiders. Aerosol insecticide may also be used, especially if there are large numbers of spiders or poisonous species are found. In general, spiders are harmless.

How to determine if your efforts are working.
You should see an immediate reduction in the number of spiders. If you continue to see spiders frequently, then you should check to see how they are getting inside. If the number of spiders is not significantly reduced or eliminated in 30 days, then call the pest controllers.

5. What you should do if your control efforts do not work.

If after 30 days your control efforts are not working, call pest controllers or the Public Works' Work Order Desk.

6. Information about poisonous spiders

Black Widow Spiders. Black widow spiders are known by the female which is ½ inch long and shiny black with a red hourglass on the underside of her abdomen. These spiders can be found anywhere, inside or outside. Most commonly they are found under stones, in stumps, in holes in the ground, and in outbuildings. They usually build their nests close to the ground and feed on insects that are trapped in their web. These spiders do not attack but will bite if provoked.

Brown Recluse Spiders. Brown recluse spiders are 5/8-1 inch long and are yellowish-brown in color. They can be distinguished by the dark violin shape on the head and thorax. Like the black widow, brown recluse spiders can be found inside or outside. They are found under rocks, debris, and wood piles. Clothing left hanging in barns or outbuildings should be checked for spiders. Indoors they can be found in closets, attics, and bedrooms. They build webs close to the ground and feed on soft-bodied insects, including cockroaches and crickets. Brown recluse spiders bite humans when provoked or accidentally touched. The bite of a brown recluse spider is poisonous, but not fatal. Untreated bites can cause a scar. The shedding of skin indicates the presence of infection.

Hobo Spiders. Hobo spiders are found in the Pacific Northwest. Sometimes called the aggressive house spider, the hobo spider will normally avoid humans. However, when crushed or squeezed, the venom is strong enough to cause considerable pain. They are 1/3 to 2/3 inches long, with several chevron-shaped markings on the abdomen. These spiders are light brown to gray and build funnel-shaped webs.

Fleas

1. Why is control needed? Flea bites are an aggravation to pets and humans. Allergic reactions can be triggered by flea bites. Fleas can transmit parasites, such as tapeworms, when infected larvae, pupae, or adults are accidentally ingested by humans or pets. Fleas may also transmit diseases, especially if the fleas are brought in from outdoors by pets.

2. General Biology

What do they look like?
Fleas are small (1/12-1/16 of an inch long), brownish-black, wingless insects. They have flattened bodies and jumping legs. Fleas can jump 14-16 inches horizontally!

How do they get in?
Fleas enter homes on pets that have been associated with the outdoors, kennels, or other homes where pets are present.

Do they multiply?
Female fleas lay 4-8 eggs following a blood meal and approximately 500 eggs in their lifetime. Eggs can be laid in the home (carpet, bedding), in the yard, or on or around the host. Eggs may hatch within a few days to a few months, depending on environmental conditions.

Where do they live?
Adult fleas can live on the pet and/or in the nest or bedding material of the pet. Eggs are laid on the pet and eventually drop off into the bedding or may be laid directly in the bedding. Flea larvae live in dirt, debris, bedding of the pet, or other protected places and feed on dried blood or other organic material.

What do they do?
Adult fleas need blood to survive. They feed on the blood of animals, including humans. Fleas cause various levels of discomfort in pets and humans, depending on the reaction of the body to the bite. Some individuals and pets may be more allergic than others to flea bites.

More about fleas. Fleas reproduce rapidly at room temperature, making our houses perfect homes for fleas. After the eggs hatch, fleas require 14-90 days to reach adulthood. The pupal stage can last from seven days to one year, if left undisturbed. An adult flea can live up to 1 year, and can live for 1 to 2 months without feeding.

3. What you should do before you go to self-help or call pest controllers.

If fleas are detected on your pet or in your home:

- Wash or destroy pet's bedding.
- Vacuum floors and furniture thoroughly; seal vacuum cleaner bags and remove from home.
- Groom pets outdoors so that flea eggs and adults will not fall off indoors.
- Trim lawns/weeds to keep the environment dry and uninviting to fleas.
- Minimize contact of pet with other animals that may be infested.
- Apply a monthly topical product that repels and kills fleas, usually available from the veterinary clinic.

Pet owners often see a sudden increase in fleas following an extended absence (vacation) from the home, especially if the pets have been placed in a kennel or with friends. When the door of the house is opened, flea pupae hatch following the vibrations of you and your pets entering the house. These newly hatched fleas are hungry and look for something to feed on—usually you and the pets. Vacuuming can remove most of the fleas. Letting the pets roam in the house will also help to relocate the fleas from carpets to the animals—the pets can then be treated to kill these fleas.

4. Self-Help Items

What to get; how many; and how often.
Sticky traps may be used, particularly if you are not sure the insects you have are fleas. These traps are better used to determine the type and extent of the problem, than to control it. The aerosol insecticide should not be used to control fleas - it may kill fleas, but will not leave a residual. This means that you have to hit the flea directly or the pesticide will do little to control the infestation. The aerosol insecticide should never be applied to pets.

How to determine if your efforts are working.
Examine your pet for adult fleas. If your efforts are working, you will no longer see black and white particles (dried blood and flea eggs) in areas where your pet is kept. Itching and hair loss on your pet will decrease and stop if your efforts are working.

5. What you should do if your control efforts do not work.

If after 30 days your control efforts are not working, call pest controllers or the Public Works' Work Order Desk. Call the veterinarian for advice on treating fleas on your cat or dog.

Ticks

1. Why is control needed? Ticks are blood-sucking parasites of mammals, birds, reptiles and amphibians, and will also bite humans. Both males and females feed on blood. Ticks also transmit several human diseases. The information in this fact sheet pertains to ticks that occur outdoors, not brown dog ticks that are found indoors. Ticks in the former category include American dog ticks, wood ticks, lone star ticks, and black-legged ticks.

2. General Biology

What do they look like?
Ticks are not insects; they are large mites that are closely related to spiders and scorpions. **Adult and nymphal ticks have 8 legs; tick larvae have 6 legs.** Tick larvae, also called "seed ticks," are very small; they are similar in size to most mites. Tick heads, thoraxes, and abdomens are fused to form an unsegmented saclike body. Ticks may be reddish brown in color when not engorged with blood. When engorged, their color becomes gray. The males are generally smaller than the females, but size varies from species to species. The female ranges from 1/8 to ¼ inch in diameter and resembles the male, but the female will engorge with blood to the point where she is ½ inch long, 1/8 inch thick, and ¼ inch wide.

How do they get in?
Ticks are picked up from the outdoors. They are carried into your home on you or your pets. They will remain on you or your pet until they become fully engorged with blood. Then they will drop off. Ticks will not get established or survive well in your home.

Do they multiply?
A female tick may lay as many as 5,000 eggs. After it lays its single batch of eggs it dies. With the exception of brown dog ticks, ticks do not multiply indoors.

Where do they live?
Ticks live outdoors in high grass and woody areas.

What do they do?
Ticks need to feed on blood to complete their life cycle. They will attach and feed on humans, pets, and livestock. Ticks are able to transmit the pathogens that cause Lyme disease, Rocky Mountain spotted fever, human ehrlichiosis and tularemia. Ticks attached to the scalp or back of the neck can also cause tick paralysis, a serious, but usually temporary, condition.

More about ticks. Ticks have a 6-legged larval stage, an 8-legged nymphal stage, and an 8-legged adult stage. The larval tick hatches from an egg. The life cycle can be completed in 2 months under favorable conditions. Larvae will feed on the host, such as a dog, for 3 to 6 days, drop off, and molt to the nymphal state in 6 to 20 days. The larvae can live for 8 months without finding a host.

Nymphs will attach to a host again and feed for 4 to 9 days. Once engorged, they drop off and molt in 12 to 29 days to adults. Adults will then attach themselves to a host and feed in 6 to 50 days to engorgement. The adults can live for 1-1/2 years without finding a host to feed on. After engorgement, adults mate and the female drops off to find a hiding place to lay her eggs.

3. What you should do before you go to self-help or call pest controllers.

Be aware that you and your pets are picking up ticks from outside. Ticks can be picked up from your yard or that walk you took in a meadow or woods hours ago.

- If you are going to be in an area that is known to have ticks, tuck your pants into your boots or socks and wear a long-sleeve shirt or over-garment.
- Wear light colored clothes so the ticks can easily be seen and removed.
- Apply insect repellent, especially repellents containing DEET, to the skin and clothes to help keep off ticks.
- Thoroughly inspect yourself for ticks after leaving a wooded area.
- Immediately remove any ticks that are attached to your skin with tweezers. Grab the mouthparts of the tick with the tweezers as close as you can get to your skin and gently pull backwards.

4. Self-help items

What to get; how many; and how often.
Since ticks are usually found in small numbers outdoors, there is nothing in self-help to either catch or kill ticks. Repellents, both for clothing and skin, can reduce the likelihood of tick bites. Use them as directed on the label.

How to determine if your efforts are working.
Check yourself, your family members, and your pets for the presence of ticks. If you or your family members continually get large numbers of ticks on your clothing or skin from areas adjacent to your quarters, call the pest controllers or Preventive Medicine for assistance.

5. What you should do if your control efforts do not work.

Call the pest controller or the Public Works' Work Order Desk for assistance. Areas around your quarters may have to be treated for ticks. Call the veterinarian for advice on treating ticks on your dog or cat.

Brown Dog Ticks

1. Why is control needed? Brown dog ticks are blood-sucking parasites of mammals and, rarely, birds. Both males and females feed on blood. The brown dog tick is almost always a pest of dogs, and is more commonly found in the southern United States. It can become established in homes and kennels. The brown dog tick seldom feeds on man, but it is unpleasant to see them crawling across walls and furniture after they have emerged from some hiding place.

2. General Biology

What do they look like?
Ticks are not insects; they are large mites that are closely related to spiders and scorpions. **Adult and nymphal ticks have 8 legs; tick larvae have 6 legs.** Tick larvae are very small and are similar in size to mites. The tick head, thorax, and abdomen are fused to form an unsegmented saclike body. The brown dog tick is reddish brown in color when not engorged with blood. When engorged their color becomes gray. The male is about 1/8 inch long. The female resembles the male, but the female will engorge itself with blood to the point that she is ½ inch long, 1/8 inch thick, and ¼ inch wide.

How do they get in?
Dogs will pick up brown dog ticks in infested residences, kennels, or veterinary clinics. These ticks may also be picked up near buildings. This may be true both in the southern and the northern United States, but the brown dog tick will not survive outdoors in the north during the cooler months of the year.

Do they multiply?
A female brown dog tick may lay as many as 5,000 eggs. After it lays its single batch, it dies.

Where do they live?
The brown dog tick lives where dogs are present. They live in warm dry places; they seldom survive well or reach high numbers outdoors. The brown dog tick will emerge from hiding places to find a dog to feed on.

What do they do?
Brown dog ticks will feed on the blood of dogs. They will lay their eggs and complete their life cycle in the house or kennel if dogs are present. They will crawl across walls, floors and furniture in search of a blood meal, a place to lay their eggs, or a place to molt.

More about brown dog ticks. The brown dog tick, like other ticks, has a 6-legged larval stage, an 8-legged nymphal stage, and an 8-legged adult stage. The larval tick hatches from an egg. The life cycle can be completed in 2 months under favorable conditions. The larvae will feed on the dog for 3 to 6 days, drop off, and molt to the nymphal state in 6 to 20 days. Larvae can

live for 8 months without finding a host dog. The nymphs will attach to a dog again and feed for 4 to 9 days. Once engorged, they drop off and molt within 12 to 29 days to the adult stage. The adults will then attach themselves to a dog and feed for 6 to 50 days to engorgement. Adults can live for 1-1/2 years without finding a dog to feed on. After engorgement, adults mate and the female drops off the dog. The female will then find a hiding place to lay her eggs. The engorged female has a tendency to move upward to lay her eggs in a crack or crevice near the ceiling.

3. What you should do before you go to self-help or call pest controllers.

- Clean the home and/or the kennel.
- Concentrate your cleaning efforts on the dog's bedding and resting areas. Throw the vacuum bag away afterward.
- Remove blood and tick debris, as well as the ticks and their eggs, by vacuuming and wiping or mopping with hot soapy water/disinfectants.

4. Self-Help Items

What to get; how many; and how often.
Self-help does not have any products available for control of the brown dog tick. However, tick control products may be available from your local veterinary clinic.

How to determine if your efforts are working.
Cleaning will help but will probably not get rid of the brown dog tick because the tick spends a good part of its lifetime feeding on the dog. Look for these ticks on your dog and crawling about the house or kennel. They may even be found hiding in cracks or crevices near the ceiling.

5. What you should do if your control efforts do not work.

Call the pest controllers or the Public Works' Work Order Desk and the veterinarian. The control of brown dog ticks requires treatment of the infested dog by a veterinarian and treatment of the quarters and/or kennel by a professional pest controller on the same day.

House Mice

1. Why is control needed? House mice eat the same food humans do as well as dry pet food. They will eat and contaminate food, destroy fabrics and furniture in search of nesting material, and gnaw woodwork, cabinets, furniture, and other materials and objects. They are capable of transmitting diseases to humans (e.g., Rocky Mountain spotted fever).

2. General Biology

What do they look like?
The total length of the house mouse is about 6 inches. The length of the head and body together is about 3 inches. The tail is almost naked and about as long as the head and body combined. The color of mice ranges from dark gray to light brown; most are dusky gray. Their bellies tend to be lighter. A mouse's head and feet are proportional to its body size. A young mouse will have a head and feet that look way too big for its body. In areas where family quarters are next to open fields or wooded areas, deer mice may come into the house. These mice are slightly larger than house mice, have big ears and eyes, and are usually reddish brown in color. Because of the association of deer mice with hantavirus, if you think you have this species present, call the pest controllers.

How do they get in?
Mice can enter a home or structure through holes in walls, floors, and the foundation. They can also enter through cracks and crevices around doors and windows. They can enter through open windows. Mice can be brought into a home in or on objects like furniture and appliances. All it takes for a mouse to enter a structure is a 1/4-inch square hole.

Do they multiply?
A female mouse can produce over 50 offspring in her lifetime. The house mouse is found throughout the world; it is the most domesticated of all rodents. They prefer to live in association with humans and manmade structures, but they can also live outside as a field rodent.

What do they do?
House mice eat and contaminate human food. They urinate and defecate continually. They gnaw and destroy furniture, woodwork, books, paper products, clothing and fabrics. Their urine and feces stain these objects. House mice are capable of transmitting *Salmonella*, other bacterial diseases, roundworms, and tapeworms.

More about house mice. Adult mice usually live 1/2 to 3 years. Mice become sexually mature at about 35 days. The average female has about 8 litters in her lifetime and litters average about 6 young.

3. What you should do before you go to self-help or call pest controllers.

- Mouse-proof your quarters.
- Seal all cracks and crevices, especially those over 1/4-inch wide. Screening 1/8-inch square or smaller or steel wool can be used.
- Do not leave unscreened doors and windows open.
- Check objects that are brought into the house, such as boxes, furniture, and appliances.
- Seal food items in metal or mouse-proof containers.
- Put food items in the refrigerator to protect them, if necessary.

4. Self-Help Item

What to get; how many; and how often.
Go to self-help and get at least 2 mouse traps for each room where there is suspected mouse activity. NOTE: Place traps along walls at a 90-degree angle to the wall.

How to determine if your efforts are working.
Look for droppings, gnaw marks, and nests. Keep an eye out for the mice themselves. Continue to use traps. Clean up or remove the droppings and urine stains because they may later be confused with new mouse activity.

5. What you should do if your control efforts do not work.

If after 30 days your control efforts are not working, call pest controllers or the Public Works' Work Order Desk.

Lice

Lice are a medical problem. When lice are found on an individual in the home, consult a physician or your Preventive Medicine Service. Although there are no items in the self-help inventory for use in controlling lice, the following information is provided to housing occupants since louse problems are commonly encountered.

1. Why is control needed? The head louse and the crab louse do not transmit or cause diseases. They can cause skin irritation and discomfort. The body louse is known to transmit 3 human diseases: typhus, relapsing fever, and trench fever. Although millions of humans have died from typhus throughout history, this and other louse-borne diseases are rare in the United States.

2. General Biology

What do they look like?
Head lice, body lice, and crab lice are wingless insects. The head louse and body louse are about 3/16 inch in length; they have distinct heads, well-formed legs, and short, stout antennae. They have noticeable eyes. Head lice and body lice look alike. Both of these lice are grayish black to dirty white in color. The crab louse is smaller and broader than the head louse or body louse. The crab louse is about 1/16 inch in length. The crab louse is dirty gray in color and looks like a crab. The nymphs of these lice look like small adults.

How do they get in?
Louse infestations are more likely to occur under unsanitary conditions when people are crowded together and personal hygiene is poor. Lice are transmitted by personal contact, sexual contact, exchanging clothes, and sharing towels and bedding.

Do they multiply?
Adult female head lice, body lice, and crab lice each lay approximately 100, 200, and 50 eggs, respectively, in their lifetimes. They will continue to multiply unless treated. They are found on the body or on clothing. Lice may temporarily survive off the body on items such as beds, furniture, toilet seats, or other objects in the home, but are not found "free-living" away from the body or clothing.

Where do they live?
Head lice and crab lice live on the human body, and are found clinging to hair. The head louse is found mostly on the human head; the crab louse is found in the pubic or the coarse haired regions of the human body, including the eyebrows. Body lice reside mainly on the clothes and will feed while remaining in contact with the clothing. These lice cannot survive off humans for a very long time. The body louse can probably survive off humans for 5-10 days, longer than the other two types of lice.

What do they do?

Lice are blood-sucking insects. Both adults and nymphs feed on blood. The bites of lice cause severe itching. Scratching the bites may result in secondary infections. The body louse is capable of transmitting human diseases, but these diseases are very rare in the United States.

More about lice. There are 3 species of blood-sucking lice that affect humans: **head louse**, **body louse**, and **crab louse** (pubic louse). The adults of these lice live about 30 days. The head louse and the crab louse attach their eggs to hair. The body louse attaches its eggs to clothing. The nymphal stage of the head louse lasts about 9 days whereas the nymphal stage of the body louse and crab louse lasts about 30 days.

3. What you should do before you go to self-help or call pest controllers.

- Since these lice do not survive off the human body very long, it is not necessary to treat the quarters with a pesticide.
- **Consult a physician or Preventive Medicine/Public Health Service.**
- Lice can be removed from clothing and bedding by laundering the linens in hot water, dry cleaning, or subjecting the items to freezing temperatures for 8 to 12 hours.
- Mattresses or furniture can also be subjected to freezing temperatures or sunned on a hot day for 8 to 12 hours to kill the lice.
- Topical medications (creams, ointments, or shampoos) are usually prescribed by a physician for personal use.
- **Treatment of lice is a personal medical problem, not a pest control problem.**

4. Self-Help Items

What to get; how many; and how often.
Self-help does not have any items that will help to control lice.

How to determine if your efforts are working.
Check your body and clothing for lice.

5. What you should do if your control efforts do not work.

Continue to consult a physician or Preventive Medicine Service professionals.