# NATO STANDARD

# AMedP-4.2

# DEPLOYMENT PEST AND VECTOR SURVEILLANCE AND CONTROL

**Edition A Version 1**
**MARCH 2014**

**NORTH ATLANTIC TREATY ORGANIZATION**

**ALLIED MEDICAL PUBLICATION**

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**NORTH ATLANTIC TREATY ORGANISATION**

**NATO STANDARDIZATION AGENCY (NSA)**

**NATO LETTER OF PROMULGATION**

18 March 2014

1. The enclosed Allied Medical Publication AMedP-4.2 Edition A Version 1, DEPLOYMENT PEST AND VECTOR SURVEILLANCE AND CONTROL, has been approved by the nations in the MCMedSB, is promulgated herewith. The agreement of nations to use this publication is recorded in STANAG 2048.

2. AMedP-4.2 Edition A Version 1 is effective on receipt. It supersedes AMedP-3(B) which shall be destroyed in accordance with the local procedures for the destruction of documents.



4. This publication shall be handled in accordance with C-M(2002)60.

Dr. Cihangir ASKIT, TUR Civ
Director NATO Standardization Agency

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# RECORD OF RESERVATIONS

| CHAPTER | RECORD OF RESERVATION **BY NATIONS** |
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| General | ESP, FRA, LTU, NLD |
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# RECORD OF SPECIFIC RESERVATIONS

| [nation] | [detail of reservation] |
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| ESP | Spain reserves the right to use the product Multispray N.O.C. 6840-33-1899283, which contains an 1% of lindane. |
| FRA | Allied publication AMedP-4.2(A) introduces the concept of integrated pest management (IPM) that uses an assortment of physical, mechanical, biological, chemical means as well as health education. The objective is to keep the use of pesticides to the minimum necessary.<br>In its part on surveillance, this concept provides for the conduct of entomological studies, which requires trained personnel and sampling equipment.<br>France is currently not able to implement these requirements; France will not systematically perform entomological studies as part of surveillance.<br>France proposes to provide for the possibility to have these studies conducted by NATO members who have the capacities (entomologists and entomology departments) to perform these studies. |
| LTU | During the military deployments pest and rodent control services are purchased from licensed contractors. |
| NLD | Chapter 1 can be implemented, preferably in the future after production of a national implementation document.<br>Chapter 2 is to be accepted for its content but we are not able to fully implement it.<br>Rationale: Although we agree on the approach to and necessity of surveillance of vectors and pests, we do not have enough skilled manpower within the Netherlands' army to comply with all procedures described.<br>Chapter 3 The Netherlands disagree with chapter 3 and will not ratify this chapter.<br>Rationale: The presented guidelines are incomplete and not completely clear with regard to emergency use of biocides which is not in accordance with stricter national regulations. Biocides used by NLD personnel should carry a NLD approval & registration number. This prohibits the formation of shared stocks and use of materials from other states, even having apparently identical formulations and/or applications. How then to deal with "multinational access, exchange and support of pesticides and repellents available in the field ensured by the J4 chain of command"?<br>In our opinion Appendices A, B and C do not make a useful |

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| | contribution because they are not readily kept up-to-date with national regulations. In fact, the parts of the appendices specifying the Dutch products admitted are already incorrect, incomplete and outdated.<br>A general approach to the selection and use of agents for first choice in contingency situations will only be practicable when clear guidelines are given (national <> military <> NATO authorities) and legal provisions are prepared for (temporary) exemption or rapid emergency licensing in such situations. |
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# CHAPTER 1

## GENERAL PRACTICE OF PESTICIDE USE AND DEFINITON OF INTEGRATED PEST MANAGEMENT (IPM)

### 1.1. Purpose and Content

The purpose of the NATO AMedP-4.2(A), “Deployment pest and vector surveillance and control” is to provide basic information on using biocides to control arthropods and other animal rodent reservoirs that transmit disease and other pests during deployment situations worldwide. Pesticides are used as part of an integrated pest management (IPM) program. IPM is an approach that combines a variety of pest management methods--including physical, mechanical, educational, biological and chemical--to prevent medical injury or economic damage from pests and disease vectors. This Guide is not intended to be a substitute for the instructions found on all pesticide labels.

### 1.2. Integrated Pest Management

#### 1.2.1. General Guidance

a. Integrated Pest Management (IPM) is a comprehensive approach to pest control/ prevention that uses an assortment of chemical, physical, and biological control techniques. IPM uses all appropriate technology and management to bring about pest prevention and suppression in an environmentally sound manner. Pesticides must be used with discrimination, rather than as the item of choice, requiring the user to be fully knowledgeable of potential negative impacts and to use preventive, non-toxic or least toxic alternatives when possible. IPM considers the pest's impact on personnel and the environment and then integrates only the appropriate cultural, mechanical, physiological, biological, chemical and regulatory measures needed to attain adequate pest management. Routine surveillance of pests is an essential part of any pest management program or effort.

#### 1.2.2. Key Terms

a. Pest Prevention. The application of pest management measures in advance of large pest populations. Prevention aims to keep the pest population sufficiently low, so as not to adversely impact people or the environment.

b. Pest Control. A term describing pest management which generally reduced pest populations to a certain level and never really achieved complete control. This approach relied almost exclusively on chemical controls.

c. Pest Eradication. A formal approach normally used to eliminate a species of great medical or economic importance from a specific geographic area. With international trade and travel, such efforts are very difficult and expensive to maintain. The military doesn't normally use this approach in its own operations except in the context of fumigation, but military units are often involved in larger, government-wide programs and in the required quarantine follow-up actions aimed at achieving or maintaining pest eradication.

### 1.2.3. Contingency Considerations

a. In most contingency operations, pest management personnel should conduct control procedures just as in a normal non-contingency setting. However, major differences will occur because forces will be operating in a contingency or combat environment, where unit positions are constantly changing. Also, there will generally be limited pest management resources, and operating conditions will be more primitive, often with much more demanding time constraints. Because of these differences, techniques such as pest exclusion are often applied on a very limited basis. Most pest management efforts should be focused on faster acting methods, like chemical pesticides. These conditions, however, should not replace the use of all available non-chemical procedures (for example, bed netting, screening) before using chemical methods.

### 1.2.4. Components of Integrated Pest Management Programs

a. If pest management is to be an integrated approach, it is necessary to have a general knowledge of the components of any pest management effort.

(1) Technical Information. The most important, but often overlooked, element of any pest management effort is ensuring that knowledge exists at all levels of the program. This is especially true today because the use of pesticides is one of very few times when we deliberately place a toxic agent into the environment with the purpose of killing a living organism. A strong emphasis should be placed on educating and training not only pest managers, but all people involved in control programs.

(2) Human Safety. Human safety is the most important concern in any pest management effort. The most common hazard occurs when workers apply pest management chemicals.

(3) Environmental Concern. Environmental concerns must be addressed before pest management procedures begin. Two major elements include maintaining safe storage facilities and properly disposing of pesticide wastes.

(4) Pest Exclusion. Most established installation pest management effort involves pests of offices, facilities and quarters. In these areas, cost-effective pest management is often achieved during the design and

construction phase by "building in" pest exclusion or "building out" the pests. New facilities should never be constructed until a qualified pest management professional or consultant reviews the plans to determine if facility design will enhance or deter pest management efforts, particularly in highly sensitive areas such as kitchens, food storage areas, laboratories, health care facilities, etc. One of the best ways to keep pest populations low is to use materials that help keep pests like rodents, birds and termites from gaining entrance into a building. If preplanning isn't possible, modifications may be needed if pest barriers are lacking.

(5) Inspection. Inspection is an important and often overlooked element of any successful pest management effort. Inspections may be formal or informal and should include pre- and post-treatment surveys. Periodically inspect every aspect of the program to determine if the techniques used are effective and achieve desired results. Use inspections to identify and help correct potential problems, as well as educate.

(6) Non-Chemical Measures

A. Cultural Measures. These measures include techniques such as sanitation, vegetation management and water management. Sanitation is probably the single most important pest management technique available. Commanders at all levels generally recognize the need for good sanitation and strictly enforce the high level of general sanitation required by service policies, directives and regulations around kitchens, and health care facilities. However, many people do not often recognize that a lack of sanitation, even in the less obvious situations, may negatively impact pest management efforts. Personnel must recognize these conditions for the potential problem they present and correct them as one of the first steps in achieving good management. In addition to sanitation, two other common cultural techniques used are water management and vegetation management. Water management is essential to control water-breeding pests such as mosquitoes or aquatic weeds. Techniques include ditching, draining, filling areas of standing water, periodically flooding slow moving streams or rivers, and adjusting water levels in ponds and lakes. Vegetation management may include plant or tree selection (to prevent species attractive to problem pests), mowing, weed control and brush removal.

B. Biological Controls. Biological controls are those that involve the regulation of pest organisms using their natural enemies. When these actions occur in nature with no human assistance, it's called natural control. With insects, there is a growing number of parasites, pathogens, and predators available to

control a given pest population. While many biological control techniques are not a total answer, and may be of limited success alone, they are good methods for use in a true pest management effort. They have improved in recent years so they are easily used. They are also environmentally safe because the control organisms are very "species-specific." This means they attack only the organism requiring control without causing damage to desirable animals or vegetation. Examples of biological controls include the use of predatory fish and insects, parasites, fungi, bacteria, nematodes, and sterile males of a pest species.

C. Mechanical/Physical Controls. These are direct or indirect nonchemical measures used to destroy pests outright or to make the environment unsuitable for their entry, dispersal, survival, or reproduction. In existing structures, these controls are mostly corrective in nature because pest managers often use equipment that makes a direct physical impact on the pest involved. Because of this equipment, and the time spent maintaining it, mechanical/physical controls are often more expensive than other categories of IPM. Examples include rat and mousetraps, sealing off cracks and crevices where cockroaches may harbor, removing and destroying wasp nests from building eaves, temperature manipulation to reduce an insect's ability to reproduce and survive, and controlling moisture under buildings to prevent the growth of wood-destroying fungi. In new construction, mechanical techniques are the best ways to exclude pests. Although they work best if done during initial construction, they are still a necessary element that should be accomplished even through structural additions or modifications. Although these methods may be more expensive initially, they are more economical over time. Also, these methods can reduce or eliminate hazards to people and the environment other methods may cause.

(7) Chemical Measures. In the past, chemical pesticides have been the largest and most widely used pest management technique. But as previously indicated, to conduct a true pest management effort, a number of appropriate methods should be combined to achieve pest reduction with the least potential hazard to people and the environment. Pest managers can apply this "combined approach" idea to chemical control efforts. Chemical control often is thought of as using pesticides to kill pests, but there are also chemicals available, such as pheromones, which serve to trap insects, confuse them, or regulate their growth. Nevertheless, pest managers will regularly need to include pesticides in most comprehensive pest management efforts. Make sure to consider all other useful pest management techniques before deciding to use pesticides.

### 1.2.5. Example of Integrated Pest Management Program: Medical Treatment Facilities and Laboratories

a. There are no pests that are unique to hospitals or labs, but there are unique situations in the hospital and laboratory environment that mandate extra care at all stages of the pest management program. This extra care includes close coordination between pest managers and the hospital or lab staff. Without this joint effort, the program will fail and adequate health care, research or testing will not be delivered to patients and other people.

Special hazards are presented by pests in medical treatment facilities. Ants, cockroaches, flies, crickets, spiders and rodents are the pests most often encountered in a Medical Treatment Facility (MTF). Other pests, such as mosquitoes and stored product insects, also may occur in the MTF and require proper management as well. While the presence of these pests in the home or workplace might be considered a nuisance, their occurrence in a hospital or clinic can create major problems for the staff and the health and safety of the patients using the facility.

b. Non-chemical control. Periodic inspections are especially important in the medical treatment facility (MTF). As with other programs, pest managers must make a thorough inspection before beginning any pest management effort. Include inside and outside areas in the survey to help locate all critical areas, such as shipping and receiving, trash collection areas, intensive care units, emergency rooms and kitchens. These areas all have either a high potential for pest development or present a situation where pesticide use is restricted. The knowledge gained about facility work flow and staff activities will help identify how pests are entering and moving through the facility. After the management program begins, it is equally important to determine its success on a regular basis. Take care to avoid disturbing patients or visitors. Check all sites that were treated and question staff members on the presence of pests in their work areas. Use sticky traps to reinforce visual inspection. Survey records to show pest population trends and to monitor pesticide effectiveness should be maintained. Unsatisfactory levels of sanitation should be coordinated with area supervisors to ensure that all problems within their control are corrected prior to treatment.

(1) Satisfactory pest management cannot be accomplished without the cooperation of the MTF staff who must be educated on the health threat caused by pests in their MTF. Inspection results and site infestation and sanitation ratings must be presented to key staff members, along with an explanation of what needs to be done to improve the situation. Physicians, nurses and administrators should be informed of all details of the plan in advance. These professionals need to know about the pesticides, methods of application and the work schedule before treatment starts so their approval is ensured and they are confident patient care will not be compromised during pest management activities.

c. Mechanical controls. The mechanical controls listed here are based on a policy of pest exclusion. If pests can be prevented from entering a MTF, the need to use pesticides will be considerably reduced.

(1) Caulk or seal all crevices around doors, windows and vents.
(2) Place tightly fitting screens on all windows that can be opened.
(3) Trim and clear vegetation from around buildings and outdoor equipment.
(4) Repair all water leaks.
(5) Use sticky cockroach traps as a surveillance tool.
(6) Check all exterior doors to ensure they fit tightly and have no holes.
(7) Inspect incoming supplies for pests.
(8) Keep outside water drains clean of debris.

d. Chemical control. Many pesticides are labeled for use in MTF, but pest managers need to ensure approval by the health care staff for any pesticides planned for use to ensure they will not have any impact on patients or sensitive equipment. Refer to Material Data Safety Sheets (MSDS) to make sure all pesticide characteristics are covered. Pesticides ideally should have low volatility, low odor, and an ability to remain effective in areas subject to constant washing. Bait stations, insect growth regulators and carbamate pesticides have been used with success in MTF.

e. Contingency considerations. In contingency operations, most established MTF and laboratories will expand to capacity to handle people evacuated from operational areas and to handle additional tests or evaluations. This will usually be done by opening up contingency wards or laboratory wings not operational during normal operations. Inspect these facilities and begin pest management operations before they open. In the contingency area, MTF and laboratories often have the same pest problems described above, but due to the nature of contingency environments, pest management may be more difficult since long-term measures are often neither practical or possible. IPM is a comprehensive, systems-based approach to pest management with the goal of providing a safe, effective, and sustainable program to reduce the impact of pest on personnel, equipment and facilities. IPM reduces the risk from pests while also reducing the risk from the overuse or inappropriate use of chemical pest-control products.

## 1.3. Controlling Pests Not Listed on the Pesticide Label

a. During contingency operations, you may encounter disease vectors not listed on pesticide labels. Examples are: kissing bugs that transmit Chagas' disease in Central and South America; tsetse flies that transmit sleeping sickness in Africa; and phlebotomine sandflies that transmit leishmaniasis and sandfly fever in many parts of the world. Take the following steps to identify the pesticides to control these vectors:

b. Find out from an entomologist or reference material how and where the vector lives during its life cycle.

(1) Determine the life cycle stage(s) most susceptible to control.

(2) Identify a pesticide labeled for controlling a familiar pest at the same site or location as the vector you want to control.

NOTE: You may apply a pesticide to control pests not listed on the label, if the pesticide controls a labeled pest at the same site. For example, during the day, nymph and adult kissing bugs (in Central and South America) hide in cracks and crevices indoors and within woodpiles outdoors. From experience, you know that bedbugs also inhabit cracks and crevices within dwellings and spiders take refuge at the same outdoor sites as kissing bugs. Therefore, you can properly apply a pesticide labeled for these familiar pests to control (using the labeled treatment methods) kissing bugs found at the same labeled sites.

c. If you can't find exactly the same site on a label and have no further guidance, think carefully and choose the pesticide label for use at the most comparable site against the most similar pest. You may occasionally make a mistake and perhaps experience a control failure or other problems with the pesticide you chose, but you should still be confident that you chose the best available pesticide and that the benefits of controlling the pests outweighed the risks involved.

## 1.4.0. Importance of Sanitation

a. Poor sanitation and improper waste disposal under wartime conditions greatly increase the potential for disease vectors such as filth flies and rodents. Even in mobile field situations, these versatile *camp followers* have historically amplified sanitation problems, often resulting in epidemics of diarrheal diseases that have caused many casualties. This threat is even greater in urban areas converted to temporary or semi-permanent military use, because personnel will not be moving every day to a different, cleaner area. In this situation, cockroaches may join other pests associated with poor sanitation in compounding the problem especially in and around structures used for food storage, preparation and consumption, and buildings used for troop housing. All of these pests must be controlled, but only in conjunction with efforts to correct the sanitation problems which provide the pests food, breeding areas, and harborage.

b. Commanders are responsible for field sanitation: however, it is your responsibility as a preventive medicine or pest control manager to inform your commander on how to make improvements, and that controlling pests includes establishing and maintaining good sanitation practices. You can't do it by yourself with pesticides alone.

## 1.5. Safety Requirements

a. A dangerous temptation during deployments, in field training or combat situations is to relax the safety requirements for pesticide use. Some people think “the rules don’t apply here.” Yielding to that temptation can cost pesticide applicators their health and the health of those around them.

b. REGARDLESS OF THE SITUATION OR THE LOCATION, ALL SAFETY REQUIREMENTS ON THE PESTICIDE LABEL MUST BE MET. During planning, ensure that if pesticides are required that applicator personnel have the proper protective equipment on hand. There is no excuse for forgetting to bring protective equipment or for failing to use it. Most pesticide poisoning incidents caused by a lack of personal protective equipment occur with experienced personnel who thought that safety requirements applied only to people with less experience or to situations when there was “more time.” The label precautions are there for a reason - TO PROTECT HEALTH. Pesticide applicators must never fail to use all the necessary protective equipment. Supervisors must not let pesticide applicators apply pesticides without it. Pesticide applicators should WEAR IT ALL and EVERY TIME.

## 1.6.0 Environmental Concerns

### 1.6.1. Negative Environmental Impacts

Concern for the environment should be a primary consideration during contingency and military operations. The impact of proper and improper pesticide application on the environment may play an important role on current and future host-nation relationships. When applying pesticides, consider the following:

a. Impact from drift and runoff to human and non-target animal species (birds, fish, bees, etc), plants.

b. Development of pesticide resistance in target organisms.

c. Potential groundwater contamination and/or spills.

d. Disposal of pesticide application waste.

### 1.6.2. Minimizing Negative Impacts

To minimize the negative impact of pesticides on the environment, adhere to the following:

a. Ensure that pesticide application is required.

b. Adhere to label recommendations and restrictions.

c. Select the pesticide that is least toxic to the environment and most specific for the pest to be controlled.

d. Treat the smallest area needed to control the pest.

e. Use only the amount of pesticide recommended on the label.

f. Mix only what you need for the daily mission.

g. Implement all possible precautionary measures to prevent any potential pesticide spills; report pesticide spills to your chain of command, contain spills if possible, keep pesticides from entering storm drains, wells, water systems, streams and rivers, and clean spills immediately in accordance with base or local procedures.

### 1.6.3 Biocide Resistance

To minimize the potential for developing pesticide resistance, abide to the following:

a. When possible, implement non-chemical controls FIRST (including sanitation, pest avoidance, use of physical barriers, and pest source reduction) prior to applying pesticides. This does not mean that pesticides cannot be used during the early stages of pest control, but they should not be used in lieu of, or without consideration of other pest management methods.

b. Avoid continuous use of a single pesticide class. Alternate pesticides with differing modes of action, including biopesticides.

c. Consider what local agricultural pesticides are in use since pests may have developed resistance to these pesticides.

d. If the situation allows, use pesticides that have a short residual life.

e. Use compatible pesticide mixtures.

f. Ensure applications are at or above the minimum rates specified on the label.

### 1.6.4. Disposing Pesticide Application Related Waists

a. The proper disposal of pesticides and related waste products is a very important aspect of minimizing the detrimental effects of pesticides on the environment. During military exercises and contingency operations, pesticide applicators must follow appropriate guidance for disposing of pesticides, pesticide rinse water and pesticide containers.

b. For operations and exercises, pesticide applicators should dispose of

pesticide, rinse water and pesticide containers in accordance with the NATO or host-
tenant agreements for that host country. If host-tenant or other agreements do not exist,
you must adhere to the requirements or your own Country's regulations.

c. When there is an inconsistency between regulations, the more stringent requirement will be used. You should still adhere to the principles of safe disposal for
pesticides, rinse water, and pesticide containers. Even during hostilities, it is important to
rinse spray equipment after use to keep it operational and to reduce the potential hazard of
pesticide exposure between uses. Unused pesticides left in a sprayer (even for a day or
two) can clog nozzles and deteriorate parts of the equipment so that the sprayer will not
operate properly. To minimize the disposal problem, mix only the amount of pesticides that
you know you are going to use. It is usually much easier and safer to mix an additional
batch than it is to dispose of a full-strength spray left over because you mixed too much. If
possible, take enough clean water to rinse the sprayer at the application site. The
equipment rinse water can then be applied at the treatment site, or used as a diluent for
the next application.

d. Excess, expired, or recalled pesticides should be turned in to an approved hazardous materials / hazardous waste collection point for proper disposal. Containers
with pesticide in any form should never be disposed of in landfills or by burning in the field.

### 1.6.5. Empty Pesticide Containers

a. When disposing of empty pesticide containers, minimize health and environmental hazards by adhering to the following:

(1) Triple rinse empty pesticide containers and add the rinse water to the sprayer as a diluent.

(2) Follow the label specific instructions in respect to disposal of empty pesticide containers. To avoid possible use of pesticide containers by local population or
unauthorized personnel, and crush or punch holes in the sides and bottoms of metal or

plastic containers and bury, if time permits, preferably in a landfill or other designated area
to prevent their reuse.

(3) Empty bags should be buried or burned.

b. To prevent troops in the field and local residents from using empty pesticide containers as cooking pots or water containers, NEVER LEAVE OR BURY USABLE
EMPTY PESTICIDE CONTAINERS, OF ANY SIZE, IN REUSABLE CONDITION. Most
pesticide labels include instructions and precautions for disposing of the container.

## 1.7.0. Controlling Biting Arthropods that are Disease Vectors

a. Throughout history, more casualties have resulted from disease transmitted (vectored) by arthropods (insects/arachnids, vectors) than injuries sustained during
combat. "Vector-borne disease" is the term commonly used to describe an illness normally
caused by a bacteria or virus transmitted to humans by blood-sucking arthropods. Vectors
typically acquire a disease by feeding on infected vertebrates (e.g., birds, rodents, other
larger animals, or humans) and passing it on to a susceptible person or other animal.
Arthropods that most commonly serve as vectors include mosquitoes, fleas, lice, biting
flies, bugs, mites and ticks.

b. Effective control of disease vectors requires developing and implementing a comprehensive program consisting of pre-deployment assessment of available
information, on-site surveillance, deployment of control methods (chemical and non-
chemical usually directed at multiple life stages) and re-assessment.

## 1.8.0. Controlling Biting Pests that are Not Disease Vectors

Pre-deployment planning includes determining the disease vectors you will likely have to control in the area of operations. Be aware that biting pests, that are not disease vectors, can also pose a significant health threat. Ants, biting midges, black flies, and non-vector mosquitoes are among the pests that have caused many casualties during military exercises, and during actual contingency operations. These casualties were victims of secondary infections of arthropod bites, or suffered severe allergic reactions to arthropod bites. The greatest threats are in tropical and subtropical areas, where warmth and moisture promote rapid growth of fungal and bacterial infections, especially in field

situations where there is little opportunity to keep clean and dry. Healing of these minor wounds is very slow in this environment and is usually retarded further because scratching the itch continually reopens the bite site. Infectious organisms are often introduced by scratching. So, even in areas relatively free of vector-borne diseases, plan on controlling biting pests that indirectly produce casualties from secondary infections and severe reactions.

### 1.9.0. Controlling Venomous Arthropods

Stings, bites or other contact with venomous arthropods can result in dermatitis, severe neurological or cytological symptoms, localized or systemic allergic reactions, and secondary bacterial infections. Examples include bees, wasps, hornets, yellow jackets, spiders, centipedes, scorpions and urticating caterpillars. Personnel should be taught to recognize local venomous arthropods and ways to avoid them when living in the field. Management of these pests usually involves a localized response to include habitat modification, limited pesticide application to include residuals and baits and environmental sanitation. Additional information about venomous arthropods may be found in the Field Guide to Venomous and Medically Important Invertebrates Affecting Military Operations: Identification, Biology, Symptoms and Treatment at http://www.afpmb.org/pubs/Field_Guide/field_guide.htm.

## 1.10. Supporting Military Operations In Urban Areas

Pre-deployment planning includes determining the disease vectors you will likely have to control in the area of operations. Be aware that biting pests, that are not disease vectors, can also pose a significant health threat. Ants, biting midges, black flies, and non-vector mosquitoes are among the pests that have caused many casualties during military exercises, and during actual contingency operations. These casualties were victims of secondary infections of arthropod bites, or suffered severe allergic reactions to arthropod bites. The greatest threats are in tropical and subtropical areas, where warmth and moisture promote rapid growth of fungal and bacterial infections, especially in field situations where there is little opportunity to keep clean and dry. Healing of these minor wounds is very slow in this environment and is usually retarded further because scratching the itch continually reopens the bite site. Infectious organisms are often introduced by scratching. So, even in areas relatively free of vector-borne diseases, plan on controlling biting pests that indirectly produce casualties from secondary infections and severe reactions.

## 1.11. Urban Control Challenges

a. Most urban pest control efforts will be directed against populations of typical urban pests (e.g., mosquitoes, filth flies, rodents, and feral animals) associated with potential epidemics. The rapid spread of disease is facilitated by crowding of civilian populations, the establishment of displaced population camps, and the greatly reduced sectors and frontages of deployed combat forces. Good sanitation and field hygiene as well as full implementation of personal protective measures in our deployed forces is critical to

successful mitigation efforts and should be continually stressed through the chain of command (see paragraph 1.4.0 Importance of Sanitation).

b. To prevent epidemics, even a single case of plague (flea-borne, from rodent reservoirs) or epidemic typhus (louse-borne) in the civilian or military population requires the immediate and highest priority effort to control the responsible vectors/reservoirs.

c. Another great concern is the convergence of displaced populations, deployed personnel, and detainee camps. The size, location, and inherent problems of maintaining adequate sanitation and hygiene standards, coupled with the historically low state of health of EPWs and displaced populations, significantly contribute to the spreading of diseases. In these situations, vector surveillance and control efforts must be closely coordinated with the responsible civil affairs units and with the medical chain of command responsible for epidemiological surveillance and treatment.

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# CHAPTER 2

# SURVEILLANCE OF VECTORS AND PESTS

## 2.1. Basic Information

a. Surveillance is the process of determining the presence of vectors and pests and of estimating their population density. Such information is the basis for developing a risk assessment that in turn can be used to qualitatively or quantitatively predict the occurrence of vector-borne disease or pest outbreaks.

b. There are many methods, techniques and equipment that can be used to accomplish surveillance. Properly accomplished surveillance of disease vectors and medical pests during deployments answer some important questions, including:

(1) Do vectors and medical by important pests in the deployment area threaten the health and morale of deployed personnel? Determine who is at risk Available medical intelligence seldom gives more than a general idea of the vector-borne disease threat in an area. Existing Medical intelligence MUST BE validated and refined or verified on site.

(2) Where, by geographical area and type of terrain; and when, by season and time of day; could vectors and medical pests occur in the area of operations? Not all disease vectors may be present in a given area, or their occurrence may be associated with different times of day or seasons.

(3) Where and when pest controllers should apply control measures against vectors and pests? Communication between the organization providing surveillance and the organization providing control is essential for effective control.

(4) Do control measures implemented actually control the target vectors and pests? Post-control surveillance serves as a validation of control efforts. If control measures are not working, alternative methods can be devised.

## 2.2. Types of Surveillance

There are three general types of surveillance programs that can be used during a deployment.

a. Baseline Survey. These are conducted to determine the types of vectors and pests occurring in the area of operations, their respective breeding sites or source

habitat, and seasonal activity patterns.

b. Operational Survey. Data collected in an operational survey are used specifically to aid vector and pest management personnel in making decisions on when to start or stop control measures. The decision to start control or management activities is based on the data collected from this type of survey when it is determined that the vectors/pests are occurring in population densities greater than that observed in baseline surveys.

c. Specific Survey. These surveys are completed when a specific vector or pest species is targeted for surveillance beyond that of the baseline or operational surveys. For instance, this could include a survey for bed bugs in a dwelling where the inhabitants are demonstrating symptoms of parasitism by these insects.

(1) The first step in executing an effective operational surveillance program is reviewing area maps to determine which topographical features and water sources might offer potential breeding sources and will serve as sites for surveillance. Basic ecological and meteorological knowledge of the geographical location will add immeasurably to successful surveillance efforts. Ideally, surveillance sites should be located between local populated areas or other potential disease sources in populated regions or between the populated areas and vector breeding sources. After potential breeding sources have been identified and traps have been set, their locations and positions, ideally using Geographic Positioning System (GPS) coordinates, should be recorded as permanent record of your surveillance program.

## 2.3. Surveillance Techniques

### 2.3.1. Mosquitoes

There are many different sampling methods and techniques for collecting mosquitoes. A comprehensive surveillance program should use an integrated approach using multiple surveillance methods to maximize the numbers collected and species diversity. Moreover, surveillance data should always be interpreted in view of the influence of environmental conditions, species-specific mosquito behavior such as activity patterns and habitat preferences. Failure of a trap or method to produce mosquitoes on a given night may be heavily influenced by these extraneous factors.

a. Adults

(1) Biting and Landing Counts. A biting count survey is the simplest and most accurate technique for determining precisely what species of mosquitoes are biting humans in an area. Biting count surveys involve one person removing their outer shirt and acting as “bait.” A second person uses an aspirator or other collection device to collect mosquitoes that bite the “bait.”

A. Biting count surveys can be conducted during the day or during the night. A flashlight can be used to locate mosquitoes a night.

B. A single person can act as both “bait” and collector by removing shoes and socks, rolling up the pants legs to the knee (or wearing shorts) and collecting those mosquitoes that bite.

C. Never use biting count surveys if there is any possibility of mosquito-borne disease in an area.

D. The landing count survey is similar to the biting count survey, but the “bait” remains fully clothed. Mosquitoes are removed from the bait's clothing by a second person as they land. Since some species of mosquitoes can bite through one or even two layers of clothing, never use landing count surveys if there is the possibility of a mosquito-borne disease in the area.

(2) Resting Counts. Resting count surveys are accomplished by collecting mosquitoes from places where they rest when they are not actively seeking blood meal. Resting mosquitoes are captured with an aspirator or other collection device. Ideal resting places include areas that are cooler and darker than the general surroundings and in undisturbed areas out of wind currents. Areas near breeding places or places where preferred hosts congregate are usually the best areas to focus searches. Examples of such areas include:

A. Under and inside buildings and other structures. Mosquitoes typically rest on vertical surfaces close to the ceiling.

B. Under bridges and culverts near the water that serve as larval habitat.

C. In animal pens, barns, chicken houses, outdoor toilets, tires, and other places near the favored hosts of the mosquito.

D. Within human dwellings, look under furniture, in closets, behind pictures, in open cabinets, and similar areas.

E. Red boxes also can be used to collect mosquitoes for resting count surveys. Red boxes should be placed 4 to 6 feet above the ground in relatively undisturbed areas. Ideally they should face the prevailing morning wind direction if this is known for the area. Mosquitoes tend to ride the wind and can find the red boxes more easily if their heads are facing the right direction.

F. Resting count surveys can also be done in houses, offices and hotel rooms by spraying the area thoroughly with a “bug bomb”, and then returning to recover dead mosquitoes from floors, tables and other horizontal surfaces. Covering the floor with a sheet or other light colored material will make it easier to find dead mosquitoes.

(3) Nets. Sweep nets or aerial (“butterfly”) nets have extremely limited use in surveying for mosquitoes, but might be used if no other methods are available.

Sweep the net back and forth in tall grass and underbrush where adult mosquitoes may be resting when they are not actively looking for a blood meal

A. Aerial nets have a light-weight mesh bag that becomes easily damaged rapidly and subsequently useless when used as described.

B. Sweep nets, used for surveying for grasshoppers, beetles and other agricultural pests, are equipped with a heavy, durable canvas bag. Unfortunately, the bag often fills with leaves, twigs and other debris, and mosquitoes trapped become damaged or difficult to find.

(4) Light Traps. One of the easiest ways to collect mosquitoes is to take advantage of the strong attraction many species have to light. Light trapping is a relatively easy means of trapping large numbers of many species of mosquitoes. They should be placed approximately 1 m above the ground, and fitted with a protective rain shield if weather conditions might produce precipitation. Ensure the trap and battery source are secured to prevent them being damaged by wind or animals. Always make sure light trap is functioning before deploying.

Because most mosquito species are attracted to carbon dioxide including some species that aren't attracted to light, carbon dioxide is often used to enhance light trap operation. Carbon dioxide may also be used alone during daylight hours to capture day biting mosquito species that are not active at night.

A. Dry ice is often used as a carbon dioxide source and can be placed in a padded mailing envelope or wrapped in a newspaper section and hung near the light trap. Carbon dioxide can also be supplied from a compressed cylinder.

B. Typically only blood feeding insects are attracted to carbon dioxide. Therefore traps that are carbon dioxide baited usually are almost free of "trash" insects that are normally found in catches from light-baited traps.

C. Some mosquito species are not attracted to traps routinely used for mosquito surveillance and special traps must be devised for their capture. Prince-Fay traps should be placed low to the ground, secured and supplemented with carbon dioxide to make them more attractive to mosquitoes. To maximize, capture efficiency, two Fay-Prince traps should be placed back-to-back to capture specimens from all angles.

D. Many traps have been designed to attract mosquitoes to various types of live bait within the traps. The mosquitoes may be captured in collection devices before they reach the bait, or they may be collected from the body of the bait as they attempt to feed.

E. To be effective, live traps must be placed where mosquitoes are located. To trap mosquitoes living in swamps, place the traps in the swamps and bait them with the animal on which the mosquito of interest normally feeds. To trap mosquitoes that feed on birds in treetops, bait a live trap with birds (e.g., young chickens) and raise the trap to the level where the mosquitoes are found.

b. Larvae and Pupae

Proper surveillance for immature mosquitoes is an important consideration during deployments. Breeding sites include tree holes, clogged rain gutters, catch basins and other artificial containers, temporary pools, roadside ditches, ponds, swamps, and marshes. Although most larval collecting is done with a white dipper, a turkey baster or syringe may be necessary to sample water receptacles with small openings, such as tree holes or certain artificial containers. These methods of mosquito surveillance are labor intensive and for this reason may not be used during routine installation mosquito surveillance programs. Nevertheless, the adults of some mosquito species may not be attracted to light or carbon dioxide and larval surveillance may give the only indication that a given species is in a deployment area.

(1) Also, when larval identifications are analyzed in conjunction with adult records, you can often determine whether your area of operations is producing its own mosquito problem or whether adults are invading from surrounding areas. Finally, larval surveys show the exact areas where mosquitoes are breeding and consequently where control efforts can be focused.

(2) Mosquito larvae may occur in any type of water occurring in nature except for salt water and hot springs. To do a larval mosquito survey it is necessary to find the water and remove any mosquito larvae in it for identification. This is not always as easy as it sounds.

(3) Most larval surveillance is done with a mosquito dipper, eg. a “frisbee disc”. The dipper is used to sample surface water (lakes, streams, swamps, temporary pools, etc.) for the presence of mosquito larvae. Larvae are removed from the dipper with a pipette or soft larval forceps and stored in 70% alcohol or other appropriate preservative. The techniques for dipping Anophiline and Culicine mosquitoes are different. Anopheles mosquito larvae have short breathing tubes and they are positioned essentially horizontal to the water surface. However, culicine larvae tend to drop in the water column when disturbed. Both styles should be done at potential mosquito breeding areas in order to capture the diversity of species present.

(4) Persistence is important. Although a disease vector may be common enough in a deployment area to be a real threat to troop health, the larvae may be widely dispersed, in very low numbers, or distributed over a very large surface area (for example, rice paddies, swamps). It may take dozens of dips to find larvae in such situations, but they can be found if looked for hard enough. A mosquito concentrator can be used to filter large amounts of water to collect mosquito larvae when densities are low.

(5) Larvae inhabiting small, localized breeding areas may be as difficult to find as larvae in large, dispersed breeding areas. Small ground pools, tree holes and artificial containers as small as snail shells may generate significant amounts of mosquitoes, yet be overlooked by personnel doing larval surveillance. Although the dipper is the most common method of collecting larval mosquitoes, there are other techniques and devices that are more useful in some situations.

(6) Mosquito larvae in jars, cans and other small artificial containers may be poured into a dipper and then removed. They may also be poured through a kitchen strainer, removed with forceps and placed in preservative solution for identification, or placed in a mosquito breeder for rearing to the adult stage.

(7) A small kitchen strainer is also useful for removing mosquitoes from water standing in rubber tires -- a favorite breeding area for *Aedes aegypti* and A. *albopictus*, as well as several other species.

(8) A kitchen (turkey) baster is useful for removing larvae from small areas such as tree holes, banana leaf axils, tires, and drain spouts. It may be useful to attach a short length of tubing to the end of the baster to reach water deep in a tree hole or similar habitat.

c. Eggs

There is only one medically important group of mosquitoes for which surveillance for eggs, called ovitrapping, is practical to the extent that is can be used as a good surveillance tool. This group includes *Aedes aegypti*, *Ae. albopictus* and a few other related species. Ovitraps should be placed at ground level in a dark, secluded place. Place a rock in the bottom of the cup for ballast if it is likely to be blown or tipped over.

(1) Female mosquitoes deposit their eggs on the surface of the paddle above the surface of the water. Eggs from different mosquito species look different under the microscope, but the eggs of Aedes are tiny, dark and oval-shaped. However, because all eggs laid in ovitraps do not necessarily belong to vector species, identification should be left to personnel trained to identify them.

(2) Eggs captured on ovipaddles can be allowed to dry and then be placed into a water in a mosquito breeder for rearing. Ideally, water used to hatch mosquito eggs should be enriched with organic material such as a single piece of dry pet food, dry grass or other vegetation, or similar materials. The number of ovitraps used in an operational setting varies according to the situation. However, a minimum of 10 ovitraps is recommended for the average area of operations. Ovitraps should be placed at ground level in sheltered, shaded areas such as under bushes near dwellings or other buildings, or near tire- or equipment-storage yards. Water placed in the ovitrap should be enriched with organic matter as described above. In arid climates, the water level in the trap should be checked at least once daily. The location of each jar should be carefully documented so that all can be checked each week. Remove the paddle, carefully drain off excess water, and package it for shipment, or rear the larvae in mosquito breeders. If ovitraps yield negative results initially, they should be redeployed to other suitable locations.

### 2.3.2. Black Flies

Black flies (Family Simuliidae, also called buffalo gnats) are vicious biters and some species in Africa and Central and South America can transmit onchocerciasis. In areas where there is no threat of onchocerciasis, black flies may make their presence known by their painful bites and no further formal surveillance is necessary. If there is a

possibility that black flies may transmit onchocerciasis based on previous reports of disease activity in a given region, specimens should be captured for species identification.

a. Adults

Adult black flies can be captured during biting or landing surveys, and feeding activity occurs during daylight which makes such techniques fairly simple. Sweep nets can be used to collect adults resting on stream-side vegetation, but this method has limited surveillance value. Light traps also can be used to collect black flies, and they are attracted to both incandescent (white) and UV-light.

b. Larvae and Pupae

Black fly larvae and pupae use short strands of silk-like material that they produce to attach themselves to rocks and vegetation emergent from bodies of water. Most species prefer rapidly moving, well-aerated streams. Immature forms of a few species may be attached to vegetation floating in still water with a high organic content. Larvae and pupae can be removed manually from their substrate for identification.

### 2.3.3. Sand Flies

Sand flies (Family Psychodidae) can be aggressive biting pests, and some species are vectors of sand fly fever, bartonellosis and leishmaniasis. Sand flies are very small (<2 mm) and when at rest generally hold their wings in an upright or V-position.

a. Adults

Sand flies often rest in rodent burrows and can be captured by inserting burrow traps in the burrow entrance. Solid-State Army Miniature (SSAM) traps placed near rodent burrows and suspended just above the ground are an excellent means of capturing sand flies. If using light traps, they should be equipped with solid wall killing jars or fine mesh bags, as most species are small enough to escape through the holes in a mosquito collection bag. A field collection bag can be made by cutting the foot section from a pair of pantyhose. $CO_2$ can be used to make the trap more attractive. Sand flies may be aspirated from rodent holes, tree holes, rocky areas, tree bark, latrines or other areas where they rest.

(1) Sand flies may also be trapped in mineral oil or olive oil spread on a flat or cylindrical piece of plastic and placed near a rodent hole, tree hole or other area where adult sand flies rest or feed. Flies will fly randomly into the coated plastic and become stuck in the oil. Placing a source of chemical light (cyalume tube) behind the plastic plate or within the cylinder can enhance attraction of sand flies to these devices. Although this technique may work, it poses difficulties when identifying captured specimens because of the oil film deposited on their bodies. In the New World, a sweep net can be used to capture sand flies resting on vegetation.

b. Larvae:

Sand fly larvae are small, difficult to find and identify. Surveillance for this group normally is based entirely on the adults so larval surveillance is not discussed here.

### 2.3.4. Biting Midges

No-see-ums, sand gnats, biting midges (Family Ceratopogonidae) can be severe biting pests. Biting midges will make their presence known by their bites and this is the most direct form of surveillance. If capture of specimens is necessary, a $CO_2$-baited SSAM trap or UV-light trap with a killing jar or fine-mesh collection bag can be used. Surveillance for biting midges is based on the adult. Larvae are primarily aquatic to semi-aquatic, and surveillance techniques are not presented here.

### 2.3.5. Tsetse Flies

Tsetse flies (Family Glossinidae) are vectors of African trypanosomiasis (African sleeping sickness) and can pose a significant threat to force health during deployments to central Africa. These flies are easy to distinguish from other flies because the proboscis is approximately one-half the body length and is directed straight forward. Adults tsetse flies are attracted to livestock (or humans), and “imitation” livestock (large squares of dark material) or animal skins. This behavior can serve as an excellent source for collecting specimens and they can be netted with a sweep net. Livestock may be tethered in tsetse fly areas or slowly led, while flies attracted to the animals can be netted. Tsetse flies do not oviposit. Rather, a single larva develops in the female fly's body and is “larviposited” immediately before it pupates. The pupa can be found buried in loose dirt and sand and can be collected by excavating and sieving this material. However, this is labor-intensive method that may not merit the time invested.

### 2.3.6. Filth Flies

Certain species of the fly families Muscidae, Calliphoridae and Sarcophagidae are known as “filth” flies because they breed in, and feed on feces, corpses, other carrion and garbage. Under certain conditions, they are capable of mechanically transmitting gastrointestinal (diarrheas and dysenteries) and perhaps other types of diseases to humans. Fly larvae can also directly in fest humans and/or animals which may head to severe tissue damage/or disease called myiasis.However, filth flies usually are more important as nuisances than as disease vectors. Filth flies are best controlled through environmental sanitation -- pesticides should only be used as supplemental control measures. Environmental control in many countries is difficult due to a cultural acceptance of garbage and feces in the environment. Filth fly populations usually grow explosively 7-10 days after a natural disaster, due to increase breeding opportunities offered by garbage, dead animals and even dead people.

a. Several methods have been developed for capturing and estimating the size of filth fly populations. If fly management is the main objective, trapping also can be an effective control tool in addition to a surveillance method. Otherwise the presence of a large population may obviate a requirement for surveillance. Only a few flies may constitute a nuisance and because all filth flies have similar habits, the “eyeball” method of surveillance will usually suffice. If the “eyeball” method discloses large amounts of filth flies, surveillance for fly larvae (maggots) should be conducted to find the source. Look for concentrations of feces, garbage, dead animals or other organic matter. Such

accumulations of organic material should be easy to find and control maggots in such areas.

b. Fly traps should be placed close to the ground, and they should be checked at least weekly for flies and any other pests, such as stored product pests. The fly trap is essentially a screen cage with a funnel-type entrance. To use it, simply place it over bait selected to attract several species of domestic flies (spoiled milk, feces, food, etc.). Fly trap counts can give a quantitative index of fly populations, but remember to be consistent in trap locations, time of day collected, and the bait material used.

c. Use of the fly grill requires a person who is proficient at recognizing the various kinds of flies. To use it, place the grill over an attractant (such as garbage on a dump), and count the number of flies landing on the grill, or a predetermined portion of it, in a given period of time (usually 1 minute). With practice, it is possible to keep counts on several species at once. Maintain records of grill counts before and after actions such as breeding reduction, pesticide treatment, etc., because the counts can help demonstrate the effectiveness of management measures and determine when additional management techniques are needed.

### 2.3.7. Fleas

Fleas are normally associated with rodents in the wild and can be recovered from rodent burrows by swabbing. The burrow swab should be inserted into the rodent hole, then removed slowly, while rotating the handle. Fleas in the rodent hole will be briefly trapped in the folds and fibers of the cloth. They can be removed with forceps and placed in a vial of alcohol for subsequent identification. An easier method is to take many 10x10 cm squares of cloth to the field, and place each piece of cloth positive for fleas in an individual ziplock bag for removal after the fleas have been refrigerated or frozen to incapacitate them.

a. Fleas also can be removed from the bodies of trapped rodents. However, this is a complex and potentially dangerous task and should not be attempted without employing stringent safety measures. This technique is addressed further in the section on rodent surveillance.

### 2.3.8. Human Lice

Body lice are always a threat when large numbers of people are thrown together in close proximity after a disaster and live in unsanitary conditions. They will spread rapidly from infested to uninfested people -- if epidemic typhus is introduced, there is potential for an explosive epidemic. Mass delousing of infested people may become necessary in such situations. The presence of lice normally can be determined by visually examining suspected individuals and their clothing.

### 2.3.9. Cone-nosed Bugs or Kissing Bugs

These insects feed off most domestic pets and the wild animals, and they are most often surveyed by finding them in direct association with their animal host. Common resting sites include the inside of mammal dens and nests. When inside human dwellings,

kissing bugs typically hide in cracks and crevices of wall, or in loosely aggregated building materials such as thatched roofs in rural villages of Central and South America. Surveillance efforts should be focused on such areas. Because kissing bugs occurring in Mexico, Central and South America often are infected with *Trypanosoma cruzi*, the parasitic agent of Chagas' disease, careful attention should be given to their surveillance in these regions.

### 2.3.10. Bed Bugs

Bed bugs are likely to be found only in the tufts, seams, and folds of mattresses and other bedding covers during early infestations. In areas of heavy infestation, bed bugs can be found in crevices in the bedsteads. Bed bugs also can be found in floor cracks, under carpets, behind loose wallpaper or wall pictures, and similar structures. Houses and buildings with bird nests or roosts also can become infested with bed bugs. The human bed bug (Cimex lectularius) and its relatives (Family: Cimicidae) form a small group of bloodsucking insects. However, these insects have never been shown to transmit any human diseases. The bite of bed bugs often is painless, but a toxic saliva injected during feeding will later cause severe itching and an inflamed welt. A series of two to three welts are often produced in close proximity. Individual sensitivity and welt size may vary widely. Surveillance should include checking any place that offers protection, such as areas behind baseboards, under loose rugs or wallpaper, and bedding materials. For dense infestations, dark spots of fecal matter or blood and the cast skins may provide good clues to their presence. Glue traps, used to capture cockroaches or rodents, also are excellent means of detecting bat bugs and bed bugs. Place these next to baseboards and other places frequented by these insects. Control measures always should include removing or excluding host animals such as bats and bird that may be serving as permanent hosts.

### 2.3.11. Ticks

Various species of hard and soft ticks are capable of transmitting numerous diseases, some of which can be life-threatening. Specific tick identification is necessary to determine disease threat. Hard tick surveillance takes advantage of the "questing" behavior of ticks in their habitat. Hungry hard ticks climb onto vegetation to wait for a suitable host for attachment. Ticks can be easily captured by using a tick drag, $CO_2$, or by removal from host animals.

a. Ticks adhere to the cloth of the tick drag as it is pulled through vegetated areas where ticks are questing. Collected ticks can be removed with forceps and held for identification. The best areas to drag for ticks are along animal trails where the vegetations is about knee level or shorter. Some designs of drags are pushed ahead of their operator rather than pulled. This may reduce the probability of ticks getting on the operator rather than the drag. Vote that "running ticks" like Amblyomma sp. or Hyallomma sp. can not be collected by the dragging method. Their behaviour resembles more those of soft ticks.

b. Tick drag operators can protect themselves from ticks while pulling the tick drag by wrapping masking tape, sticky-side out, around the pant legs in one or two places (above the ankle and above the knee). Ticks will adhere to the tape, will not bite the operator and the tape serves as an additional source of surveillance. Ticks are attracted to $CO_2$, and if they are active in a given area this attraction can be used for surveillance. Put

a large block of dry ice (several pounds) on a sheet, board, piece of cardboard, or similar structure placed on the ground. Return in about 2 hours and examine both sides of the substrate for ticks. The long exposure time is necessary because ticks crawl slowly and take a long time to get to the $CO_2$ source, even though attraction is strong. However, this method may not be practical in all operational settings.

c. Some soft ticks, unlike hard ticks, are painful biters. However, soft ticks are only infrequently encountered in comparison to hard ticks. Although some soft ticks are attracted to $CO_2$ and may be captured as described for hard ticks, the best way to survey for most species in this group is visual inspection of their habitats: animal burrows, caves, cracks in rocks, abandoned buildings, etc. However, this is a difficult and time consuming effort best performed by well trained personnel.

### 2.3.12. Mites

Larval mites of the genus *Leptotrombidium* transmit scrub typhus in parts of the eastern hemisphere. Elsewhere, chigger mites (*Trombicula* and other genera) readily parasitize people resulting in itching, irritating bites. As a rule of thumb, if rodents are present then so are mites. Chigger mites are very small and are typically less than 1 mm in gross size.

a. Mites can be surveyed using the “black plate” method. The “black plates” (dark-colored construction paper, paper plates or similar objects) are placed on the ground in mite habitat such as grassy or brushy areas with high rodent populations. The mites are primarily rodent parasites and run around in these areas when not feeding on the rodents. Plates should be placed directly on the ground or ground cover. The plates have no particular attraction for the mites, but they crawl randomly on the plates and can be seen against the dark surface.

b. After at least an hour, examine both sides of the plates for small (smaller than a pin head), rapidly moving white, yellow, orange or red spots. Remove with a small camelhair (or similar) brush and place in alcohol for subsequent identification. Mites may be removed from an inflexible surface by wetting a small paint brush in alcohol, touching it to the mite, and then dipping the brush with the adhered mite into a vial of alcohol. The mite will float free in the alcohol. If construction paper or other flexible material is used, roll in a cone, place the small end of the cone over the vial and tap sharply. Mites will fall into the vial.

### 2.3.13. Rodents

Most rodent surveillance is accomplished to determine rodent presence and infestation levels in warehouses, dwellings and similar structures. Species determination is not particularly important. Surveillance in this case is usually done by visual survey for feces, damage, rub marks and sightings of dead or live rodents, or sometimes with live or snap traps or glueboards. Commensal rodents usually do not cause the problems in the field as they normally do at permanent installations, but other wild rodents may become nuisances or serve as reservoirs of disease. Rodents, as well as their ectoparasites,

occasionally must be collected to determine the presence of known, or perhaps new, vector-reservoir systems.

a. Trapping rodents. Snap traps can be used, but must be used correctly to ensure that ectoparasites, particularly fleas, are recovered. Rat traps available through the National Supply System are too large and mouse traps are too small. The preferred trap is a “museum special”, which is intermediate in size and must be local purchased. Snap traps work better if the triggers are “expanded” with hardware cloth, thin metal, etc. At sunrise or sunset, set 50 to 100 traps in a line in areas where rodents are active. Areas such as fence lines, along paths, where a wooded area meets a grassy area, etc., are ideal. Bait the traps with chewed oatmeal or other useful bait, and place the traps five to ten feet apart as rapidly as possible. As soon as the last trap is set go back to the first trap and start picking up the traps. If rodents are caught, put each rodent and the trap that caught it in a separate ziplock bag to make sure parasites remain associated with their hosts. Speed is essential. Fleas will leave a dead host as soon as its body temperature drops two or three degrees.

(1) Live capture traps of several varieties are effective in trapping rodents for ectoparasite surveys. These do not kill the rodent so immediate pickup is not as essential. They may be set in the evening and collected the next morning. If Sherman or similar solid-wall traps are used, they must be picked up very early in the morning or the sun will raise the temperature within the trap to levels lethal to the rodent, and ectoparasites will leave. As with snap traps, live capture traps with their contained rodent should be placed in individual self-sealing (ziplock) bags so ectoparasites will not be separated from their hosts. When the rodents are returned to the laboratory, they must be sacrificed (if living) and their ectoparasites removed. If identification of rodents in the field is impossible or impractical, the rodent should be prepared so it can be identified by an authority on rodents.

(2) Live traps containing rodents can be placed in a killing chamber -- a large jar containing several gauze pads soaked with chloroform or similar anesthetic. This will put the rodent to sleep painlessly and continued exposure will kill it. Check the ziplock bag for ectoparasites and place any found in a vial of alcohol. Rodents also can be euthanized by placing them into a container with dry ice to which a little water has been added.

(3) When the rodent is dead, remove it from the trap and check the trap and killing chamber for ectoparasites, which will also be dead. Place any parasites found in a vial of alcohol. Then the rodents must be processed in one of two ways to remove their parasites. Use a nit comb or small, stiff-bristled brush to vigorously brush the rodent, against the grain of the hair, into a white enamel cake pan or similar container. The ectoparasites will be brushed out of the hair and into the cake pan. Remove them and store in a vial of alcohol, along with any ectoparasites that were removed from the ziplock bag, trap and killing chamber.. It is sometimes necessary to identify the rodent from which the ectoparasites were removed, so host-parasite associations can be determined. In the field, a trained mammalogist or entomologist would prepare a “study skin” and this, plus the skull of the rodent, would allow identification by a properly trained individual. Rodents may be frozen and held for identification if available personnel are not able to make a specific determination.”

(4) Due to the risk of infection by hantavirus and other severe diseases associated with rodents, handling rodents in the field without appropriate protective equipment is not recommended -- rodent collections should only be done where absolutely necessary and by trained personnel. Rodents can spread many diseases to humans and will bite, and they also will eat food supplies. During natural disasters, when living conditions are stressed, rodent infestations are particularly problematic. When dealing with rodents in a disaster location, rodent control with anything but “deadly force” may be difficult. Recommended control techniques include:

## 2.4. Sampling and Interpreting Surveillance Data

a. Estimating population density for a vector or pest is the most common use of arthropod sampling data after the determination of their presence or absence from the area of operations. For instance, it is important to know that a potential malaria vector, Anopheles, occurs in the area of operations, but a more important and pertinent question concerns the population density of this vector. Large vector populations often are associated with an increased likelihood of outbreaks of disease. For military deployments, measures of relative abundance of vector/pest populations are the most practical means of assessing their size.

b. Sampling for obtaining an estimate of population density can be most easily achieved through a systematic approach. Systematic sampling involves using a predetermined approach such as placing light traps or ovitraps at the same locations and for the same amount of time, or taking the same number of dips with a mosquito dipper with the same form and spacing as used in previous efforts. A similar approach is to develop a serial sampling approach where trapping is conducted at the same locations, but at different times or dates to account for seasonality of the vectors.
The actual number of samples to be taken depends on the personnel available to conduct the work, and the complexity of the area of operations and associated vector/pest habitats. However, surveillance should always strive to use a minimum of three (3) concurrent samples of each type in an immediate sampling area to account for natural variation. For example, use three SSAM traps or ovitraps in the same immediate area if possible. Sampling should also be accomplished on a scheduled basis when possible to account for weather related changes and seasonality. The extent and location of all continued sampling should be based on sound baseline information determined at the outset of the deployment.

c. In order to implement control or management decisions, an action threshold must be established based on surveillance data. Although baseline surveillance provides the important initial information of presence or absence of a vector or pest, abundance data collected during additional surveillance can provide important insight into their relative population dynamics. For example, if the number of female mosquitoes increased beyond a pre-established abundance index, then control measures may be warranted. The action threshold will be unique for each group of pests or vectors and operational location. However, if vector/pest populations are large and serve as a continuing threat to force health, then establishment of an action threshold may be irrelevant. Calculation of an abundance index is the foundation for determining an action threshold. For example, a

weekly abundance, or trap index (TI) for adult female mosquitoes collected in light traps can be calculated as:

TI = Total female mosquitoes trapped/Total trap nights

Where total trap nights is calculated by multiplying the number of traps used by the number of nights operated.

This index of abundance can be modified as appropriate for specific species of mosquitoes, or other vectors (e.g., sand flies, larval dipping, tick drags), and can also be adapted to evaluate mosquito population dynamics among different days, especially following control measures to determine if they were effective.

## 2.5. Sampling Equipment

Although there are many different methods and sampling devices available for collecting vectors and pests, not all of them are likely to be used in an operational environment due to practical, logistical or security reasons. Indeed, the equipment and techniques used for base level surveillance in a non-operational environment may be quite different than that described here. Whether at base level or deployed, an integrated sampling approach using as many collection methods as practically possible will maximize the quantity and diversity of species collected. The methods and sampling devices described here are those that are most commonly used by military entomologists under operational conditions or are readily available through supply channels. A few of these sampling devices can be constructed on site with available materials.

a. Equipment and Tools

(1). Portable battery operated light traps. These traps are small, light-weight, battery operated, and have solid-state circuitry. They generally run on 6 volts supplied by 4 D-cell batteries or rechargeable 6-volt, 10 Amp hour (AH) gel-cell batteries. A photoelectric switch allows for the trap start operating by itself at dusk. A rain shield can be fitted to the trap for use in damp conditions. The fan remains running until the battery is disconnected to prevent live mosquitoes from escaping through the top of the trap. For field use, at least two batteries are needed for each trap, so one battery can be charged while the other one is in use.

A. Light traps may be baited with carbon dioxide to enhance attractiveness to mosquitoes and other blood-feeding, flying arthropods. Carbon dioxide can be supplied by a regulated compressed gas container or through placement of dry ice suspended in an insulated container.

B. Light traps can be fitted with net collection cages if live specimens are required for viral studies, or with glass or plastic killing jars if dead specimens are acceptable. If desired, a fine-

mesh collection bag can be added to retain tiny dipterans such as sand flies. Ideally, several SSAM traps can be used in an area to conduct mosquito surveillance. In all but the most heavily infested areas, these traps typically collect few mosquitoes (~5 per night) when used without $CO_2$ attractant. The addition of carbon dioxide will normally increase trap collections 5 to 10 times.

C. CDC Fay-Prince Trap. This omni-directional Fay-Prince are one of the few commercially available traps that will collect adults of both sexes of day-flying *Aedes* (e.g., *Aedes albopictus* and *Ae. aegypti*) and certain other mosquitoes. Effectiveness of this trap is great enhanced with $CO_2$. The design is based upon the attractiveness of contrasting gloss black and white panels and employs a wind-orienting cover. A cylinder houses a suction motor and also supports the collection bag or killing jar. Fay-Prince traps do not use light and are powered with a 6 V batteries.

D. UV-light traps. Ultraviolet (UV)-light attracts a greater number and diversity of certain flies (e.g., biting midges and sand flies) and other insects than incandescent light. Both SSAM and Fay-Prince traps can be fitted with UV-light bulbs for this purpose. Up- and down-draft versions of these traps are available. When compared to traps using incandescent light, UV-light traps will collect a greater diversity and more mosquitoes when no $CO_2$ is available as an additional attractant. Wand style UV-collecting lights powered by rechargeable gel battery packs are also available commercially.

E. Ovitrap. Ovitraps are used to collect the eggs of certain day-flying, container inhabiting *Aedes* (*Stegomyia*) mosquitoes including *Aedes aegypti* and *Ae. albopictus*. Ovitraps provide a means of qualifying the presence or absence of these mosquitoes that are not normally collected in standard commercially available mosquito light traps. These mosquitoes are known as container inhabiting Aedes because they prefer to lay their eggs in a variety of natural and artificial containers. As the eggs and larvae are virtually identical, adults must be reared from the immature stages to determine species identification. *Aedes aegypti*, *Aedes albopictus* and other *Stegomyia* species are of great concern because of their ability to transmit diseases (e.g., dengue and yellow fever) to deployed forces.

i. Ovitraps consist of glass or plastic containers, of approximately one-pint capacity, painted or colored flat black or other dark color. A wooden tongue depressor wrapped in light colored cotton muslin cloth, germination paper, or paper

toweling and attached with rubber bands is placed inside the jar and held in place with a large paper clip. The jar is then filled about half full of water, which ideally should come from a natural source that is attractive to mosquitoes (not too clean, not chlorinated, etc.). If possible, punch a drain hole approximately 1cm (½ inch) below the lip of the jar to prevent overfilling. A clean stone or other chemically neutral weight should be added to the bottom of the jar as a counterweight to hold the ovitrap in place. Enough water should be added to the cup to keep the paddle moist until the next collection, but not so much that the ovipaddle is entirely submerged and oviposition is prevented.

ii..Ovitraps should be checked at time intervals sufficient to ensure that they do not become dry. In most areas, 250 to 300 ml of water in a 10 m (12-oz) ovitrap (1/3 full) will be sufficient for about a week. Ovitraps are not a stock-listed item, but they can easily be fabricated on-site from available materials. In some areas, collection effectiveness can be enhanced by placing two ovitraps side-by side, one with hay infusion (described in gravid trap section) and one with water as described. Female mosquitoes will deposit their eggs in the cleaner ovitrap.

(2) Light sticks. Light sticks emit light when the plastic tube containing the reactive chemicals is flexed allowing those chemical to mix. Once reacted, light sticks produce light for up to 12 hours. They are waterproof and do not produce heat. Although many different colors of light sticks are available commercially, yellow is the preferred color when used for attracting insects. Light sticks are inexpensive, readily available through a variety of commercial sources, and they have a shelf life up to 4 years if properly stored.

(3) Mosquito dipper. The mosquito dipper is a simple and standard tool for conducting larval mosquito surveillance. It consists of a white plastic cup attached to a handle approximately 1 m long. Mosquito dippers are available commercially at nominal costs, or they can be constructed on-site from available materials.

(4) Mosquito breeders. These rearing containers work by placing a water sample containing mosquito larvae and pupae in the lower portion of the container to approximately one-half full. As adults emerge they fly though an inverted cone into the dry upper chamber where they can be collected. The entire container can be refrigerated for the purpose of calming specimens, or captured specimens can be asphyxiated with $CO_2$ through the vented top of the container. Mosquito breeders can be purchased from commercial sources, or manufactured from local supplies. For *Aedes aegypti* and/or *Ae. albopictus*, zip-lock bags

thumb-tacked by the corner to a wall will suffice. Feed larvae alpha-pellets or fish food.

(5) Emergence trap. Emergence traps are available commercially or can be fabricated on-site. There are a variety of styles, but the basic premise of these traps is to collect insects emerging from their aquatic or terrestrial habitats. Emergence traps offer the advantage of allowing the investigator to determine with certainty the species emerging from a particular habitat.

(6) Gravid trap. The gravid trap is designed primarily to collect gravid *Culex* mosquitoes. The trap consists of the trap body, collection bag, and oviposition bucket/pan. Organically rich water infusions made with aged hay, sod, dead vegetation, or feces is placed in the bottom of the pan approximately 2,5 cm (1 inch) below the opening of the trap entrance. Female mosquitoes attracted to the water as a place to oviposit are subsequently drawn into the collection bag by the traps fan. Because gravid traps collect mostly females ready to lay eggs, they are also likely to have taken a recent blood meal. A higher proportion of mosquitoes from gravid trap collections will be infected with arboviruses or other pathogens if present in the area. As a result, gravid traps offer an ideal collection tool for capturing adult female *Culex* for virus screening. A 6V gel-cell battery powers the trap. This trap can be ordered with a photoelectric eye to permit night-time only operation. Approximately one handful of hay should be added per gallon of water and allowed to stand for 5-7 days, stirring ever couple of days for a typical hay infusion media. Some media modifications add a teaspoon/gallon of brewers yeast and lactalbumin at the start of the infusion. Other successful infusions have been made using sod, grass clippings, or livestock feces. Pour media through strainer prior to use (screen or cheese cloth). Oak leaf or infusions made from other materials have been successful for increasing non-*Culex* species such as Aedes *albopictus* or Ae aegypti. Gravid traps are relatively inexpensive and should be part of any integrated surveillance program.

(7) Red box. These structures serve as artificial resting sites for mosquitoes. The interior of these resting sites is often painted red, or some other dark color as dark colors seem to be attractive to certain groups of mosquitoes. The size of the red boxes is not critical although units 30 x 30 cm (12 X 12 inches) may be more manageable. Also, boxes should be large enough that the mosquitoes can see them easily and that an aspirator or other collection device can be introduced into the box to collect them. Red boxes can be permanent; wooden boxes, clay pots, etc., or they can be fashioned in the field by spraying the interior of a cardboard box with red spray paint. Ideally, red boxes should be oriented towards the prevailing wind direction in order to optimize attractiveness to flying mosquitoes.

(8) Aspirators. Aspirators are used to collect flying insects that are too small to grab with forceps or too excitable to collect by hand. Aspirators come in several sizes and styles from multiple commercial sources, and they can be either mechanical or mouth-operated (designed for either blowing or inhalation). Mouth aspirators that can be obtained with HEPA filters are useful for removing mosquitoes from trap nets, or resting collections. Smaller mechanical battery powered aspirators can be used, but these aspirators rarely have sufficient suction power for collections. Several larger backpack or hand held type aspirators are very useful for certain types of sampling. Commercial versions of both gas-powered and 12 V battery-powered backpack aspirators are available. These backpack units use either modified leaf blowers or powerful 12 Volt motors attached to a 10 cm (4-inch) hose ending in a collection cup. Excellent hand-held larger units are also available. These later, more powerful aspirators are excellent for making representative resting collections in a variety of habitats (e.g., edge of vegetation, barns, inside homes, tree holes, under bridges, etc.). The gas-powered versions are perfect for outdoor work, while the 12 V battery versions do not kick up as much dust and are not as noisy/disruptive. The later are ideal for indoor collections including *Aedes aegypti* in yellow fever/dengue endemic areas. Aspirator collections are ideal for capturing large numbers of mosquitoes that should be used for pathogen testing to determine field infection rates.

(9) Cooking Baster. A standard kitchen or “turkey” baster can be a valuable and inexpensive tool for sampling mosquito larvae inhabiting tree holes and other small containers. The tip can be fitted with a piece of tubing (Tygon or similar) to sample habitats that are difficult to reach such as narrow tree holes.

(10) Burrow traps. These traps consist of a cylindrical tube with an inverted cone at one or both ends. The trap is inserted into animal burrow or similar places, and as insects fly out for feeding or other activities they are captured in the trap. Emergence traps can be purchased from commercial sources or fabricated on site from plastic bottles and funnels. Emergence traps are excellent tools for collecting sand flies and biting midges emerging from animal burrows.

(11) Fly traps. Fly traps, sometimes known as Dodge traps, are primarily intended for filth fly surveillance. They can be variously designed, but the basic configuration consists of a screened cage with a funnel type entrance mounted in the bottom. The trap is suspended over decaying organic materials such as food, meat, or feces. Filth flies attracted to the bait fly upwards and are collected by the trap. Fly traps also can be constructed from available materials on location.

A. Scudder fly grill. A fly grill consists of several crossed wooden slats approximately 2,5 cm (1 inch) wide and 60 – 200 cm (2-3

feet) long. The fly grill is placed over an attractant or bait, and the number and types of flies landing on it during a given time period (e.g., 1 minute) are counted. Records of the types and numbers of flies observed on the grill can be recorded to help determine what management actions should be taken. Fly grills can be easily constructed from available material on location.

(12) Insect sweep net. Sweep nets are used to collect insects and other arthropods in heavy vegetation and brush. These nets consist of a heavy muslin or sail cloth bag attached to a rigid, wire frame and a wooden or aluminum handle. Sweep nets are not useful for collecting delicate insects such as mosquitoes, but they may be useful for collecting larger insects such as adult horseflies (Tabanidae) and black flies (Simuliidae). A wide variety of sweep nets are available commercially and they are relatively inexpensive.

(13) Aquatic dipnet. These nets are similar to the insect sweep net, but they are designed for collecting organisms from aquatic environments. They can be used to collect the larval stages of horse, deer and black flies. They are of less value for collecting mosquito larv*ae.* The net consists of a heavy muslin bag on a steel frame with a sturdy wooden handle. Aquatic nets are available for a variety of commercial sources.

(14) Tick drag cloth/burrow swabs/flagging. Tick drags are made from a large (at least 1 $m^2$ (three feet square)) piece of flannel, canvas or other cloth. A piece of wood or similar material is attached along one side of the cloth to give it rigidity, and a piece of rope is attached by tying one end of the rope to each end of the wood. The rope is used to pull the tick drag through tick habitats. Burrow swabs and flags are simply a square of flannel or other “fuzzy” material attached to the end of a piece of heavy-gauge wire (such as a straightened-out clothes hanger) with rubber bands.

(15) Glue boards and sticky-type traps for arthropod trapping. The premise of these traps is that the animal becomes stuck in the sticky substance and cannot free itself. They are highly effective for surveillance and control of many types of pests including flies, spiders, roaches, fleas and scorpions. Glue boards and sticky traps can be bought commercially as individual traps, or they can be easily constructed from available materials coated with sticky material purchased in bulk. According to European Community legislation, glue boards and sticky traps are not allowed for trapping vertebrate animals, e.g. rodents, snakes or lizards.

**(16)** Rodent traps. A wide variety of rodent traps are available for use on deployments. The most commonly used rodent traps include snap traps, Sherman traps and cage traps. Sherman and cage traps should be used in instances when the capture effort is not intended to kill the animal. All of these traps are highly effective when set along rodent

travel corridors and baited appropriately. Ideally, baits should be those that the animal cannot remove from the trap without being captured. Additional information about surveillance and collection of arthropod vectors and rodent reservoirs may be found in the Field Guide to Operational Surveillance of Medically Important Vectors and Pests at http://www.afpmb.org/sites/default/files/pubs/guides/operational_surveillance_guide.pdf

# CHAPTER 3

NATO CONTINGENCY PESTICIDE LIST

## 3.1. Purpose and Content

1. The purpose of the NATO AMedP-4.2(A), “DEPLOYMENT PEST AND VECTOR SURVEILLANCE AND CONTROL” is to provide **basic information** on using pesticides to control disease vectors and pests during field situations worldwide. This must also include the professional use and the rapid availability of pesticides in emergency or outbreak situations during contingency operations, especially in case of NATO Joint Deployment Operations (NAJODOs). Historical data and recent experiences during conflicts and wars clearly show that the hospitalization rate of soldiers due to communicable diseases usually reaches values between 65% and 80% of the overall rate. Approximately 2/3 of diseases currently defined as of military importance are vector-borne. High-risk vector-borne diseases like malaria and dengue fever are known as potential war stoppers in large, and geographically diverse areas of the world. To date, more than 160 infectious diseases are defined as emerging or resurging on the worldwide scale. Many of these diseases are also showing increasing levels of drug resistance. Therefore, one of the basic approaches of AmedP-3(A) must be to provide Force Health Protection by using vector control measures to prevent infections and/or othr medical problems from arthropod or rodent disease vectors of military importance. IPM-principles will be followed whenever the tactical situation permits, and only pesticides and application techniques proven as effective are to be used in order to rapidly:

   a. interrupt the transmission cycle of naturally occurring, or intentionally spread vector-borne diseases,

   b. prevent further geographical spread of diseases,

   c. minimize the remaining epidemic potential at least within the camp site areas by reducing infected vector populations to levels where they are incapable of transmitting disease.

2. Pesticides are only to be applied using techniques appropriate for the target vector population. This listing is not intended to be a substitute for the pesticide label instructions without further emergency licensing by an authorized

## 3.2 Registration requirements for pesticides and repellents

Only pesticides and repellents registered and proven effective by either the national governmental authorities (e.g. USA-EPA, GBR-HSE, or

DEU-BAuA), or by the national medical service of a NATO member country acting as special independent health authority according to its national laws against communicable diseases, are to be used to achieve control of epidemics of vector-borne diseases. In order to ensure both, legal use and in-theatre availability of the vector control products listed, the national governmental registration authority, registration number, and/or military order reference of the responsible medical service should be notified. Registered pesticide products must be applied using devices and techniques with proven effectiveness for the product and all applications will be done in accordance with label instructions. If no registered product is available for a vector species, rapid emergency licensing may be done in accordance with national regulations in order to overcome the time delay for regular licensing, e.g. the 120 days emergency licensing of pesticides by the DEU-BAUA (Bundesanstalt für Arbeitsschutz und Arbeitsmedizin). Once pesticide products have been proven effective and have been licensed for vector control by the responsible civil governmental health authority of one member nation of the European Community its generally legal use is currently guaranteed by all other EC countries according to the EC Biocide Guideline 98/8/EG. As of September 2013, Guideline 98/8/EG will be superseded by the new EC Biocide Guideline 528/2012 (see: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:167:0001:0123:EN:PD; REGULATION (EU) No 528/2012 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL, dated 22 May 2012). In case national regulations for pesticide use are more strict, specific national regulations will apply.

### 3.3. Emergency vector control during epidemics

Emergency vector control measures during outbreaks of military important vector-borne diseases must be conducted in accordance with applicable national laws and/or specific NATO health regulations, and will be supervised by the responsible national military preventive medicine physician and/or, in case of NAJODOs, by the responsible NATO Theatre Surgeon. Effective vector control operations are to be implemented as rapidly and extensively as necessary to control the epidemic using applicable vector population control principles and with an emphasis on the safe use of chemical methods. In order to ensure military readiness for emergency vector control operations during deployments, sufficient supplies of appropriate emergency equipment, application devices, pesticides and repellents must be provided and kept on stock. Multinational access, exchange and support of pesticides and repellents available in the field will be ensured by the J4 chain of command.

### 3.4. Contingency list of Insecticides/Acaricides

1. Insecticides/Acaricides must be approved by a responsible governmental health intitution or the responsible military health service with respect to the national laws against communicable diseases according to the population eradication principle against

    a. mechanical disease vectors (cockroaches, commensal flies/filth flies, commensal ants), and

b. blood-sucking disease vector arthropods.

2. In emergency cases during outbreak conditions, rapid special licensing to a defined target vector/indication is possible only by responsible governmental or military health institutions.

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| **Product:** | **Preventable diseases**: | **Indication/ Approved against:** | **Mode of Application:** | **Effective Compounds:** | **Registered by (Reg.-No./ Nation):** | **National Stock Number (NSN):** | **Manufacturer:** | **Precautions:** | **Remarks:** |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| B-5 Baygon WP 75, Wetable powder, 1 kg-can | Flea-, soft tick-, mosquito- and cockroach-borne diseases | Fleas, soft ticks, commensal flies, adult mosquitoes, commensal cockroaches (including organochloride-resistant strains), bed bug | Prepare sprayable suspension of WP in water (fleas:0,5%; ticks: 1%; flies, cockroaches 2-4%) | 75% Propoxur | DEU-Federal Environmental Agency, (B-0090-00-00/ GE) | 6840-12-183-5543 | Bayer Vital GmbH, D-51368 Leverkusen | Do not spray directly on foodstuff; clean carefully contaminated parts of the body with soap esp. after contact with undiluted WP | New standard product (different NSN!) contains only 25% Propoxur WP |
| | | | | | | | | | |
| Solfac EW, 1 l can | Cockroach-borne diseases | Cockroaches | Residual spray, applied using pneumatic sprayer after dilution of concentrate in water | 5% Cyfluthrin | DEU-Federal Environmental Agency, (B-0068-00-00/ GE) | none | Bayer Vital GmbH, D-51368 Leverkusen | Caution! Clean carefully contaminated parts of the body with soap, especially after contact with suspension concentrate or W.P. Do not spray on foodstuff. Avoid | |

| | | | | | | | | | |
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| | | | | | | | | inhalation of spray mist. | |
| | | | | | | | | | |
| Detmol-per, 1 l can | Louse-borne diseases | Fleas, hard ticks, soft ticks, commensal flies, adult mosquitoes, bed bugs, commensal cockroaches, head and body lice (not to be applicated to persons) | Residual spray with flushing and knock-down effect, applied as cold fog or using pneumatic sprayer | 24% Permethrin, 25% Pyrethrum | DEU-Federal Environmental Agency, (B-0077-00-00/ GE) | none | Frowein GmbH u.Co.KG 72437 Albstadt | Caution! Clean carefully contaminated parts of the body with soap, especially after contact with suspension concentrate or W.P. Do not spray on foodstuff. Avoid inhalation of spray mist | |
| Arrow Aircraft Disinsectant | Imported mosquito-borne diseases | adult mosquitoes | One-shot hand-held aerosol for disinsection of aircraft | 2% d-Phenothrin | DEU-Federal Environmental Agency, (B-0203-00) | none | Dr. Lüsges GmbH Postfach1380 52233 Eschweiler | For aircraft disinsection only. Do not spray on foodstuff. Avoid direct inhalation of aerosol. | According to international Health Regulations |
| Schwab-Exprime 30 g plastic applicator | Cockroach-borne diseases | Cockroaches | Ready-to-use bait, bait with <0,5 g Gel per bait station. | 2,15% Imidacloprid | DEU-BAmA N-22825 | none | Frowein GmbH u. Co. KG 72437 Albstadt | Avoid direct contact with foodstuff | |
| | | | | | | | | | |
| finicon Schabengel | Cockroach-borne | Cockroaches | Ready-to-use bait, bait with | 0,09% Bifenthrin, microencapsulated | DEU-BAmA N-20623 | none | Frowein GmbH u. Co. KG | Avoid direct contact with | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 30 g plastic applicator | diseases | | <0,5 g Gel per bait station. | | | | 72437 Albstadt-2 | foodstuff | |
| | | | | | | | | | |
| Detmol-flush 400 ml spray can | Indicator spray for cockroach-borne diseases | Cockroaches | Ready-to-use-spray with high repellent and flushing effect to monitor insect infestations. To be sprayed directly in cracks and crevices where insects hide. | 0,34% Pyrethrum | DEU-BAmA N-10624 | none | Frowein GmbH u. Co. KG 72437 Albstadt-2 | Do not spray on foodstuff. Avoid extended inhalation of vapors | |
| Vectobac WDG 3.000 ITU, 25 kg can | Mosquito-borne diseases | Mosquito larvae | Applied using pneumatic sparyer after dilution of the WDG into water surface. Usable in combination with methoprene. | Toxins of Bacillus thuringiensis var. israelensis, 3000 IU/mg radiation-sterilized, microencapsulated product. | Hot listed | None | Culinex Bauhausstr. 46 67069 Ludwishafen | For outdoor use only. Do not spray on foodstuff. Avoid inhalation of WP. | |

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### 3.5. Contingency list of Rodenticides

1. Rodenticides must be approved by a responsible governmental health intitution or the responsible military health service with respect to the national laws against communicable diseases according to the population eradication principle against

   a. commensal urban or periurban disease-carrying rodents, and

   b. sylvatic disease carrying rodents.

2. In emergency cases during outbreaks conditions, rapid special licensing to a defined target vector/indication is possible only by responsible governmental or military health institutions.

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| **Product:** | **Preventable diseases**: | **Indication/ Approved against:** | **Mode of Application:** | **Effective Compounds:** | **Registered by (Reg.-No./ Nation):** | **National Stock Number (NSN):** | **Manufacturer:** | **Precautions:** | **Remarks:** |
|---|---|---|---|---|---|---|---|---|---|
| Conrax-top-Concentrate | Rodent-borne diseases | Rats and mice | Mix liquid concentrate and cereals 1+49 to form a ready - to - use bait. | 0,25% Bromadiolon | DEU-Federal Environmental Agency, (23253-60/ GE) | none | Frowein GmbH u. Co. KG 72437 Albstadt-Ebingen | Avoid contact with foodstuff. Concentrate or bait must be applicated so that children and domestic animals (dogs, cats) have no access. | |
| | | | | | | | | | |
| Contrax-D Bloc, 60 g block | Rat-borne diseases | Rats | Ready - to - use wax-bound block for use in wet areas, formulated to deliver a lethal dose, used when resistances against first generation coumarins occur. | 0,0025% Difethialon | DEU-Federal Environmental Agency, (B-0137-00-00/ GE) | none | Frowein GmbH u. Co. KG 72437 Albstadt-Ebingen | Avoid contact with foodstuff; Powder or bait must be applicated so that children and domestic animals (dogs, cats) have no access | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| Difenacoum Fertigköder, 100 g Packs | Rodent-borne diseases | Rats and mice | Ready - to - use rodenticide (granular bait) packed in sealed sachets that have to be placed unopened (for rats) or opened (for mice) near normal runs and feeding areas. | 0,006% Difenacuom 0,02% Sulfonamides | DEU-Federal Environmental Agency, (03910-60/ GE) | none | Bertram GmbH 66903 Dittweiler | Avoid contact with foodstuff. Powder or bait must be applicated so that children and domestic animals (dogs, cats) have no access | |

### 3.6. Contingency list of Repellents (skin and fabric repellents)

Skin and fabric repellents have to be approved as sufficient repellent active and effective against disease-carrying blood-sucking arthropods in case of epidemics. Skin repellents have to be registered and licensed as a drug, or as a cosmetic with proven efficacy as repellent. Basing on todays` knowledge, fabric impregnation has to be carried out only with permethrin-based (cis:trans= 25%-40%:75%-60%) dipping or spraying formulations, or by ready-to-wear factory treated fabrics (primarily battle dress uniforms).

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| Product: | Indication/ Approved against: | Mode of Application: | Effective Compounds: | Registered by (Reg.-No./ Nation): | National Stock Number (NSN): | Manufacturer: | Precautions: | Remarks: |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | | | | | | |
| Insektenschutzmittel Bundeswehr | Blood-sucking arthropods | Application of ointment onto exposed skin areas | 30% N,N-Diethyl m-toluamide (DEET) | GE-MoD, Medical Service | 6840-12-354-2927 | Bundeswehr Pharmacy Koblenz | Avoid contact with eyes, mucous membranes, and injured skin. May corrode plastics. Do not ingest ointment. | formulated as ointment to extend repellent time |

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# ANNEX A

# ALPHABETIC LIST OF CONTRIBUTING NATO MEMBERS INCLUDING INFORMATION ON AGENT, SPECTRUM OF ACTION, MODE OF APPLICATION, EFFECTIVE COMPOUNDS, PRECAUTIONS AND SOURCE OF SUPPLY OF THE INSECTICIDES AND ACARICIDES

1. General observations on the use of Insecticides and Acaricides. Since insecticides and acaricides do not kill pest insects and mites only, but (after uptake of appropriate amounts) also harm other animals and man. Therefore, these agents should be applied only in limited amounts and in the lowest effective dose.

2. The application should be conducted by trained personnel only, the instructions must be followed carefully and all necessary precautions must be taken.

3. Under all circumstances, any contact with food-stuff must be avoided.

4. As long as other chemical compounds are available, chlorinated hydrocarbon insecticides - such as Aldrin, Dieldrin, DDT, µ-HCH and others, should not be used because of their accumulation in the body.

## A.1. Belgium (BEL)

**INSECTICIDES**

General rules for use

a. The personnel handling insecticides shall wear the complete protection suit with a panoramic mask fitted with an adequate filter.

b. Eating, drinking and smoking are prohibited while using insecticides.

c. Avoid any contact of pesticides with foodstuff or beverage; keep the pesticides secure in cool, dry and well locked places.

d. Kitchen utensiles that have possibly been reached by insecticides have to be washed before use.

e. Move the domestic animals away during the use of pesticides.

f. The personnel has to take a shower and to rinse the equipment after use.

1. **Belgium (BEL)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| 1. MaxForce White | Cockroaches | Gel ready to use | Imidaclopride 2,15 % | General | Edialux |
| 2. Volcide | Ants | Ready to use bait stations. For indoor use. | Diméthylarsinate de sodium 2,9 % | To be kept out of reach of children and domestic animals | Edialux |
| 3. Aircraft | Against mosquitoes on aircraft | Ready to use aerosol spray. Used during flight. | D-phénothrin 2 % | General | Belgagri |
| 4. Vulcano Fumigène | Flying and crawling insects | ”One shot”, residual gas | Permethrine 5 % + pyrethre naturel 5,4 % | General | Belgagri |
| 5. Muscado Flash | Flying insects | Knock down aerosol spray. To treat volume. | Tétraméthrine 0,3 % + d-phénotrine 0,15 % | General | Belgagri |
| 6. Insectstop | Crawling insects | Knock down aerosol. To treat surfaces and chase away the crawling insects. | Pyréthrine 0,1 % + Permétrine 0,23 % | General | Belgagri |
| 7. Quick Bayt | Flying insects | Tablet to use dry or to dilute to whitewash | 0,5 % Imidacloprid | General | Edialux |

1. **Belgium (BEL)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| 8. Permas D | Ants and wasps | Powder ready to use. For outdoor use. | Perméthrine 0,75 % | General | Edialux |
| | | | | | |
| 9. Aqua Py | Flying and crawling insects | Aqueous emulsion, applied using pneumatic sprayer | Perméthrine 30 g/l +Pipéronly Butoxide 135 g/l | General | Edialux |
| | | | | | |
| 10. k'OTHRINE FLOW | Crawling insects | Aqueous suspension, for local treatment. Residual action. | Deltaméthrin 25 g/l | General | Edialux |
| | | | | | |
| 11. EXIT 100 EW | Flying and crawling insects | Aqueous emulsion, applied using pneumatic sprayer. To treat surfaces and volumes | Cypermethrine 100 g/l | General | Belgagri |
| | | | | | |
| 12. EXIT WP | Flying and crawling insects | Wettable powder, applied using pneumatic sprayer. To treat surfaces residual action for 4 to 8 weeks | Cypermethrine 100 g/l | General | Belgagri |
| | | | | | |
| 13. Permas 100 EC | Flying and crawling insects | Aqueous emulsion, applied using pneumatic sprayer. Local treatment. | Permethrin 100 g/l | General | Edialux |
| | | | | | |

## A.2. Canada (CAN)

### PRECAUTIONS AND GUIDELINES

1. Regulatory. Use of pest control products (PCPs) (e.g., insecticides, rodenticides, repellents) shall normally be restricted to those that are registered by the Pest Management Regulatory Agency (http://www.hc-sc.gc.ca/ahc-asc/branch-dirgen/pmra-arla/index-eng.php) of Health Canada. Label information for Canadian registered PCPs is available at: http://pr-rp.hc-sc.gc.ca/ls-re/index-eng.php.
2. Product use. PCPs shall normally be used in accordance with: label directions and other conditions of registration; and, as is applicable, by other laws, policies and regulations, including those specific to the Canadian Department of National Defence.
3. Application/Applicators. Excepting personal repellents, clothing treatments and similar products that have, as an objective, personal use by the non-trained individual for prevention of arthropod bites, PCPs shall normally only be applied by authorized personnel, e.g., persons who hold appropriate pest management authorizations and/or certifications. For example, Preventive Medicine technicians carry the following pest management certifications: core, biting fly, structural, fumigation, industrial vegetation management. Training curricula for pesticide education, training and certification are available at: http://www.hc-sc.gc.ca/cps-spc/pest/part/fpt/educ-cert-eng.php.
4. Record keeping. Excepting personal repellents, clothing treatments and similar products that have, as an objective, personal use by the non-trained individual for prevention of arthropod bites, use of PCPs shall be recorded. Records shall, minimally, comprise the following information: the PCP applied (active ingredient); the PCP registration number; the application rate; the application site; the method of application; the names of the persons who applied the pesticide; the reason (e.g., target pest) for the application; and any noteworthy circumstances that occurred during the application.
5. Contact information. Information related to pest management shall normally be directed to/received from CAN operational medical authority. Additional technical information related to CAN pest management operations and standards is available from:
Directorate of Force Health Protection
Canadian Forces Health Services Group Headquarters
Department of National Defence
1745 Alta Vista Drive
Ottawa, Ontario, Canada
K1A 0K6
6. Other information.

A. Personal protective equipment. Personnel protective equipment shall be used in accordance with requirements set out on product labels and with those as set by applicable laws and regulations.
B. Disposal statement. Pesticides, rinse water, and pesticide containers should be disposed of in accordance with Canadian and/or host-tenant agreements.
C. Contracting. Where pest management activities are undertaken by a third party, including contractors, such shall normally be consistent with standards articulated at paras. 1 through 6; or to substantially equivalent standards as set out by another member nation.
D. Equipment. Pesticide application by Canadian Forces personnel is normally with directed, low-volume, single-wand sprayers, wiping, daubing and painting equipment, injection systems, or drop spreaders. Backpack sprayers are a primary application modality, though a mounted sprayer capacity exists.
E. For a given product, suppliers might vary. Where applicable, substitutions with similar products might be made.
.

2. **Canada (CAN)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| | | | | | |
| 1. Bacillus thuringiensis israelensis (0.2 billion ITU/kg) (VectoBac 200G). CAN registration number 18158. | Mosquito larvae | Apply as formulated by conventional aerial or ground equipment. Use 3-10 kg/ha; with higher rates in deep and/or polluted water. | Bacillus thuringiensis israelensis. | Wear a long-sleeved shirt, long pants, waterproof gloves, shoes and socks, eye goggles and appropriate NIOSH-approved respirator when handling, mixing/loading, or applying the product and during all clean-up repair activities. Wash thoroughly with soap and water after handling. Do not apply directly to drinking water reservoirs or drinking water receptacles when the water is intended for human consumption. | Valent Canada Inc., Guelph, Ontario. |
| | | | | | |
| 2. Cyfluthrin (20%) (Tempo). 420 g. CAN registration number 25673. | Flying, crawling, stored product and other pests. | Dilute with water. Apply with pressurized or power operated sprayers. For spot, crack and crevice applications use 1 or 2 level "Tempo" scoops per 3.75 L of water to make a 0.05% or 0.1% suspension. Use higher concentrations where infestations are severe or where longer residual protection is required. | Cyfluthrin | May be harmful if swallowed or inhaled. Do not get into eyes, on skin, or on clothing. Avoid breathing dust or spray mist. Wear a NIOSH-approved respirator when mixing, loading and applying. Wear long pants and chemical resistant gloves when handling. Wash thoroughly with soap and water after handling. | Bayer CropScience Inc., Calgary, Alberta, Canada. |
| | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 3. Dichlorvos (19.2%) (Home Defense). 65 g. CAN registration number 22027 | Flying, crawling, stored product and other pests. | Apply as formulated. Remove the strip from the pouch and suspend with the accompanying hook in an enclosed space of up to 30 cubic metres. Strips should be at least 3 m apart. | Dichlorvos | Wash hands after handling. For use in unoccupied areas, or areas occupied for < 4 hrs/day. | Scotts Canada Ltd., Mississauga, Ontario, Canada. |
| | | | | | |
| 4. Hydramethylnon (2.15%) (Maxforce Roach Killer bait gel syringe). 60 g. CAN registration number 24239 | Cockroaches. | Apply as formulated to cracks, seams, and other inaccessible areas. Reapply when bait is no longer visibly present. | Hydramethylnon. | Use only in areas not accessible to children and pets. Keep exposed gel away from open food and food contact surfaces. Do not apply to food areas of restaurants. | Bayer CropScience Inc., Calgary, Alberta, Canada. |
| | | | | | |
| 5. Lambda-cyhalothrin (10%) (Demand CS). 235 mL-10L. CAN registration number 27428. | Mosquitoes and other flying, crawling, stored product and wood damaging pests. | Dilute with water. Use as a crack and crevice treatment indoors; can be used as a perimeter treatment outdoors. Mix 3 ml per L water to yield finished solution containing 0.03% lambda cyhalothrin. Can be applied at 21 day intervals and not more than 4 times/yr. | Lambda-cyhalothrin. | May be harmful if swallowed or inhaled. Do not get into eyes, on skin, or on clothing. Applicators should wear long pants, long-sleeved shirts and chemical resistant boots and gloves. During mixing, loading, clean-up and repair activities, workers must wear chemical resistant gloves, safety goggles or a face shield. Wash gloves before removal and hands after use. Very toxic to fish and aquatic organisms. Do not contaminate ponds, lakes, streams or rivers or any bodies of water by direct application, during filling or rinsing procedures. | Syngenta Canada Inc., Guelph, Ontario, Canada. |

| | | | | | |
|---|---|---|---|---|---|
| 6. Malathion (95%) (Gardex ULV Concentrate). 20 L. CAN registration number 16198. | Mosquitoes and flies. | Apply undiluted as ULV for mosquito and fly control (Aerial: 425-550 mL/ha; excepting residential areas where application is to be at no more than 300 mL/ha; Ground: for mosquitoes, 40-80 mL/min at 10 Km/h and 60-130 mL/min at 15 Km/h). | Malathion. | Harmful by swallowing, inhalation or skin contact. Avoid breathing spray mist and contact with eyes, skin or clothing. Do not contaminate bodies of water by direct application, cleaning or equipment or disposal of wastes and containers. | Gardex Chemicals Inc., Etobikoke, Ontario, canada. |
| | | | | | |
| 7. Methomyl (1%); z-9-tricosene (0.025%) (Stimukil Fly Bait). 400 g. CAN registration number 24969. | Filth flies. | Apply as formulated. Scatter bait daily or as needed; place in bait station when used in areas accessible to birds. | Methomyl; z-9-tricosene. | Where chemical resistant gloves while applying; wash thoroughly after using. Do not use in homes of where food is processed or stored. | Troy Biosciences, Phoenix, Arizona, USA. |
| 8. Methoprene (4.25%)(Altosid Pellets). 10 kg. Canadian registration number 21809. | Mosquito larvae. | Apply as formulated. For ground and aerial application. Use lower rates (2.8-5.6 kg/ha) for "clean" water sites such as meadows, rice fields, woodland pools, tidal marshes, artificial water holding containers, etc.; use higher rates (5.6-11.2 kg/ha) for sites with a higher organic load, e.g., waste treatment settling ponds, ditches and other man-made depressions, storm drains and catch basins, cesspools, septics, etc. | Methoprene. | Avoid breathing dust; the use of a NIOSH/MSHA/BHSE approved respirator with a suitable dust filter when transferring bulk product is recommended. Avoid contact with eyes, skin and clothing. Where chemical resistant gloves when handling or applying. Do not use in water that may be used for immediate human or livestock drinking purposes. Avoid contamination of aquatic systems other than the target area. | Wellmark International. Guelph, Ontario, Canada. |
| | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 9. Methoprene (2.1%)(Altosid XR Briquets). 8 kg, 220 briquettes. Canadian registration number 27694. | Mosquito larvae. | Apply as formulated. Apply to storm sewers and catch basins. Use 1 briquet for catch basin/storm sewer of up to 5,500 L; 2 for catch basin/storm sewer between 5,501 and 11,00 L, etc. Apply no more than once per season unless briquets have been dissolved or flushed away. | Methoprene. | Avoid breathing dust; avoid contact with eyes, skin and clothing. Wear chemical resistant gloves when handling or applying. Do not use in water that may be used for immediate human or livestock drinking purposes. Avoid contamination of aquatic systems other than target area. | Wellmark International. Guelph, Ontario, Canada. |
| | | | | | |
| 10. Orthoboric acid (99%) (BORiD). 11.3 kg. Canadian registration number 22379. | Cockroaches, ants, carpenter ants, silverfish. | Apply as formulated. Liberal application in areas where target pest hide/nest (cockroach); inject powder for 3-5 s into tunnels and cavities (carpenter ants). No powder should be visible in living areas after application. | Orthoboric acid. | Harmful if swallowed. Apply in areas inaccessible to pets and children. Avoid eye contact; wash thoroughly after handling. | Waterbury Companies Inc., Waterbury, Connecticut, USA. |
| | | | | | |
| 11. Permethrin (240 g/L) (Prelude 240). CAN registration number 26509 | Mosquitoes and other flying, crawling, stored product and wood damaging pests. | Dilute with water. Apply with appropriate equipment. For 0.5% emulsion, mix 84 mL product with 4 L of water; for 1% emulsion mix 168 mL with 4 L of water; scale appropriately for larger volumes. Used as spot and crack and crevice treatment for indoors pest control. Can be used outdoors as a perimeter treatment (0.5% emulsion) including for mosquitoes. | Permethrin. | Avoid breathing vapours or spray mist. Avoid contact with eyes and skin. An approved respirator must be worn when applying. Applicators must wear protective clothing inclusive of hand, foot and eye covering. Highly toxic to bees. Do not contaminate water through spray or drift, cleaning of equipment or disposal of wastes. | AMVAC Chemical Corporation. Newport Beach, California, USA. |
| | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 12. Pyrethrin (0.5%); piperonyl butoxide (4.8%) (Pyrocide multi-purpose spray). CAN registration number 24729. | Flies, mosquitoes, midges and other crawling and flying insects. | Apply as formulated. Can be used as space treatment indoors and outdoors; can be used as surface treatment. | Pyrethrin and piperonyl butoxide. | Avoid inhalation of spray and contact with skin and eyes. Wash after use. Do not contaminate food. For terrestrial uses only. | McLaughlin Gormley King Company, Minneapolis, Minnesota, USA. |
| | | | | | |
| 13. Resmethrin (0.25%) (Konk). 325 g. CAN registration number 24247. | Wasps, bees, hornets and yellow jackets. | Apply as formulated. Direct as insect or nest to be treated (from a distance of ca. 3 m), ideally when insects are at rest. | Resmethrin. | Wash thoroughly after using; do not contaminate food, utensils, food preparation, handling or storage areas. | Air Guard Control, Concord, Ontario, Canada. |
| | | | | | |

## A.3. Czech Republic (CZE)

No contribution submitted.

## A.4. Denmark (DNK)

The Danish army has no more in stock any insecticides or rodenticides. Instead we depend, when necessary, on civilian professional companies, which are authorized by governmental authorities to perform insect- and rodent control. All chemicals used by these firms are listed in the "Register of Approved Pesticides" (ISBN: 87-503-7010-3), which is revised every year.

## A.5. France (FRA)

5. **France (FRA)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| 1. One Shot Insecti-cidal Aerosol 697.920.052.002 | Flying insects | One-shot hand-held aerosol for aircraft disinsection | 2% d-Phenothrin | Do not spray on foodstuff. Avoid inhalation. Store between 0 and 50°C | PSA |
| | | | | | |
| 2. ATOX Aerosol 697.920.010.002 | Flying insects | Ready -to -use powder to be applied directly into cracks and crevices. Recommended for indoor use | 1,8% Tetramethrin, 0,5% Sumithrin, 1,3% Piperonylbutoxide | Do not use at temperatures >50°C, do not dust on foodstuff. Avoid inhalation of dust. | SICO |
| | | | | | |
| 3. Insecticidal Powder 697.920.030.102 | Crawling insects | Ready -to -use powder. Directly applied on surfaces where insects crawl or hide | 0,16% Neosynephrin, 0,09% Sumithrin, 0,8% Piperonylbutoxide | Do not dust on foodstuff. Avoid inhalation of dust. | SICO |
| | | | | | |
| 4. King 91 697.920.040.500 | Flying and crawling insects | WP to be diluted in water for use with pneumatic sprayer. | 11% Malathion, 5-15% Propetamphos 19% Dichlorvos | Do not spray directly on foodstuff. Strictly avoid contract with concentrate and spray mist. | SICO |
| | | | | | |
| 5. Lindan Powder 697.910.175.210 | Ectoparasites, especially human lice | Powder for direct treatment of body hair and clothing | 1% Lindane | For personal treatment strictly according product label according | SICO |
| | | | | | |

5. **France (FRA)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| 6. K-Othrine ULV 15/5<br>1 l bottle<br>697.920.040.661 | Flying insects | ULV-formulation with residual activity | 1,5% Deltamethrin,<br>0,5% Esbiothrin | Strictly avoid skin and eye contact with ULV-mist. | AgrEvo |
| | | | | | |
| 7. Abate Granneles<br>25 Kg can<br>697.920.040.700 | Aquatic insect larvae, esp. mosquito Larvae | Impregnated sand grannules, applied by hand | 1% SG Temephos | Do not treat foodstuff | AgrEvo |
| | | | | | |
| 8. K-Othrine EC25<br>1 l bottle<br>697.920.040.781 | Flying insects | Impregnation of bednets | 2,5% Deltamethrin | Strictly avoid skin and eye contact. | AgrEvo |

## A.6. GERMANY (DEU)

**Precautions - Use of Insecticides and Acaricides**

As a general principle, insecticides are only to be applied with other measures according to the principle of integrated pest management (IPM). Aim is to reduce the amount of biocides in order to minimize exposure to humans, animals and environment. During epidemics of vector-borne diseases, specifically licensed products are to be used.

a. Only officially approved insecticides are to be used.
b. All insecticides approved specially for MOD use will, wherever practicable, carry the statutory approval of the Umweltbundesamt and/or the Biologische Bundesanstalt für Land- und Forstwirtschaft.
c. Pesticides may only be applied by personnel who have received appropriate education, examination and training.
d. Proper accounts of insecticide storage, issue, use and disposal are to be kept.
e. Transportation must be carried out according to the national law for hazardous substances.
f. Individuals suffering from certain skin complaints, including cuts and grazes, are not to be employed on insect control duties. If in doubt, medical advice should be sought.
g. Personnel using insecticides should have washing (and ideally showering) facilities readily available.
h. Personnel are not allowed to eat, drink or smoke when using insecticides.
i. When spraying near electrical power supplies, care should be taken to switch off beforehand, and to strictly avoid spraying, electrical power sockets. When spraying in kitchens, appliances should be allowed to cool beforehand.
j. Foodstuff and food preparation surfaces are to be protected from insecticides.
k. Personnel are not to be sprayed directly with insecticides.
l. Only sufficient quantities of insecticides are to be mixed for the task in hand.
m. The acceptable personal protective equipment must be compatible with the requirements of the national safety regulations (TRGS 523).
n. Redundant insecticide and empty or damaged containers are to be disposed of in such a manner as to preclude contamination of the environment. Containers are not to be reused.

6. **Germany (DEU)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| 1. B5 Insecticide Wetable powder 1 kg-can | Crawling insects | Suspension of the WP in water (Against: ants 0,2 %, fleas 0,5%, ticks 1% (200ml/m²); flies, gnats, cockroaches, wasps 2-4 kg (50 ml/m²) | 75% Propoxur | Do not spray directly on foodstuff; clean carefully; contaminated parts of the body with soap especially after contact with the undiluted WP | Bayer AG 51373 Leverkusen Stock of the German Bundeswehr Stock-number: 6840-12-183-5543 |
| 2. Solfac EW 1 l can | Flying and crawling insects | Residual spray, applied using pneumatic sprayer after dilution of concentrate in water | 5% Cyfluthrin | Caution! Clean carefully contaminated parts of the body with soap, especially after contact with suspension concentrate or W.P. Do not spray on foodstuff. Avoid inhalation of spray mist. | Bayer AG 51373 Leverkusen |
| 3. Detmol-plus 1 l plastic bottle | Crawling insects, flying insects, mites, ticks, spiders, millipedes | The concentrate must be diluted with water to 1%, produces "flushing effect", if added (0,5%) to other insecticidal sprays | 25% Pyrethrum, 46,6% PBO | Do not spray directly on foodstuff. Avoid inhalation of vapors | Frowein GmbH & Co KG 72437 Albstadt |
| 4. Detmol-per 1 l can | Flying and crawling insects | Residual spray with flushing and knock-down effect, applied as cold fog or using pneumatic sprayer | 24% Permethrin, 25% Pyrethrum | Caution! Clean carefully contaminated parts of the body with soap, especially after contact with suspension concentrate or W.P. Do not spray on foodstuff. Avoid inhalation of spray mist | Frowein GmbH &.Co. KG 72437 Albstadt |

6. **Germany (DEU)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| 5. Juven Ex EC | Cockroaches flees and flies | Residual spray, applied using pneumatic sprayer, after dilution in water. Recommonded for sensible and Living areas intested. | 1% Pyriproxyfen 27,6% Pyrethrum(25%) 55,2% Piperonylbutoxid | Do not spray directly on foodstuff | Bayer GmbH 51373 Leverkusen |
| 6. Detmol-cap 1 l plastic bottle | Cockroaches and other crawling insects | Residual spray, applied using pneumatic sprayer, after dilution in water. | 10% Cyphenothrin microencapsulated | Do not spray directly on foodstuff | Frowein GmbH & Co. KG 72437 Albstadt |
| 7. Detmol FOG 1 10 l can | Flying and crawling arthropods | Residual heat fog with knock-down and flushing effect | 0.8% Permethrin 1,6% Pyrethrum 1,6% PBO | Do not fog on foodstuff, avoid inhalation, decontamination may be necessary. Attendant fire risk. | Frowein GmbH & Co. KG 72437 Albstadt |
| 8. Pyrifix-Combifog | Flying and crawling insects | Non-residual heat fog with knock-down and flushing effect | 0,4% Pyrethrum, 0,4% Bioallethrin, 1,2% PBO | Do not fog directly on foodstuff, avoid inhalation. Attendant fire risk. | Chembico Hauptstr. 13 67283 Obrigheim-Mühlheim |
| 9. Schwab-Ex prime 30g plastic applicator | Cockroaches | Ready-to-use bait, bait with <0,5 g Gel per bait station. | 2,15% Imidacloprid, | Avoid direct contact with foodstuff | Frowein GmbH & Co. KG 72437 Albstadt-2 |
| 10. finicon Schabengel 30 g plastic applicator | Cockroaches | Ready-to-use bait, bait with <0,5 g Gel per bait station. | 0,09% Bifanthrin, microencapsulated, | Avoid direct contact with foodstuff | PPS GmbH Max-Eyth-Str. 13 73269 Hochdorf www.pps-vertrieb.de |

6. **Germany (DEU)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| 11. Detmol-flush 400 ml spray can | Cockroaches and other crawling insects | Ready-to-use-spray with high repellent and flushing effect to monitor insect infestations. To be sprayed directly in cracks and crevices where insects hide. | 0,34% Pyrethrum | Do not spray on foodstuff. Avoid extended inhalation of vapors | Frowein GmbH & Co. KG 72437 Albstadt-2 |
| 12. Vectobac WDG 3.000 ITU, 25 kg can | Mosquito-Larvae, blackfly Larvae | Applied using pneumatic sprayer after dilution of the WDG into water. Use 500g/ha water surface. Usable in combination with methoprene. | Toxins of Bacillus thuringiensis var. israelensis, 3000 IU/mg sterilized, microencapsulated product. | For outdoor use only. Do not spray on foodstuff. Avoid inhalation of WP. | Culinex Bauhausstr. 46 67069 Ludwigshafen |

6. **Germany (DEU)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| 13. Altosid SR 20<br>5 gal can | Aquatic insect<br>Larvae | 4 l concentrate can be diluted with up to 1 $m^3$ water. Application by spraying. Formulation has residual larvicidal activity that lasts for up to 30 days. Use 50-75 ml concentrate/ha for treatment of naturally flooded areas, and extend amount to 150 ml concentrate/ha to treat artificial breeding places where water is polluted with organic material (e.g. sewage systems). Recommended for use in combination with Bti (Vectobac). | 20 % Methoprene | Do not spray on foodstuff. Wear personal protective clothing and gloves when applying manually. | Culinex<br>Bauhausstr. 46<br>67069 Ludwigshafen |

## A.7. GREECE (GRC)

**General Rules**

a. Insecticides must never be allowed to come into contact with food or drink.

b. Household utensils which have been contaminated must be washed before use.

c. Avoid inhaling insecticide aerosols (gasmask).

d. No smoking or eating while insecticides are in use.

e. Protect skin and clothes by wearing an overall, headdress, and, it deemed advisable, boots.

f. Remove domestic animals to a safe place.

g. Provide bath or shower, or at least washing facilities for people who have been using insecticides.

In the event of poisoning, see a doctor.

**7. Greece (GRC)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| 1. Aerosol new Smart | Flying Insects (Flies, Mosquitoes etc.) | Spray | DDVP 0.6 % | POISON | D.T.B. Hellas<br>1 Pireos St. Athens |
| | | | | | |
| 2. Airtox | " | Spray-Powder | Pyrethrins 0.23 % | " | Levifarm O.E.<br>53 Marni St. Athens |
| | | | | | |
| 3. Drumer Aerosol | " | Spray | Pyrethrins 0.2 % | " | Ntestre (Hellas)<br>2 Aristotelus St.<br>Drapetsona-Piraeus |
| | | | | | |
| 4. Emotox Aerosol | " | Spray | DDVP 0.6 % | " | National Can Greece<br>25 Km National Road<br>Athens-Korinth |
| | | | | | |
| 5. Guard | " | Spray | DDVP 0.8 % | " | Minigaz, 18 Amerikis St. Athens |
| | | | | | |
| 6. Comet Aerosol | " | Spray | DDVP 0.6 % | " | Viospray EPE<br>12 Sapfous St., Athens |
| | | | | | |
| 7. Mafu-Spray Neo | " | Spray | DDVP 0.8 % | " | Bayer Epifa AE<br>55-59 Deligeorgi St.<br>Athens |
| | | | | | |
| 8. Med-Rock | " | Solution | Neopynamin 0.3 % | " | Med-Hell (Hellas) AE<br>14 Epidayrou St.<br>Chalandri-Athens |
| | | | | | |

**7. Greece (GRC)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| 9. Aerosol Banedon | Cockroaches Ants etc. | Spray | Dursban 1 %<br>Pyrethrins 0.05 % | POISON | National Can Greece<br>17 I. Metaea AVE,<br>Athens |
| | | | | | |
| 10. Aerotoe Aerosol | " | Spray | Chlorpyrifos 0.05 %<br>Diazinon 0.5 % | " | Aero Aebe<br>Lasani-Levanti St.<br>Peristeri-Greece |
| | | | | | |
| 11. Black Star | " | Spray | Diazinon 0.8 %<br>Pyrethrins 0.3 % | " | N. Petsiavas AE<br>II. Nikodimoy-Vouli<br>Athens |
| | | | | | |
| 12. Baygon Spray | " | Spray | Baygon 2 %<br>DDVP 0.5 % | " | Bayer-Epifa AE<br>55-59 Deligeorgi St.<br>Athens |
| | | | | | |
| 13. Piridur | " | Spray | Chlorpyrifos 1.17 %<br>Bioallethrins 0.25 % | " | Emtea AE<br>I. Mitmopolros St.,<br>Athens |
| | | | | | |
| 14. Shelltox | " | Spray | Dursban 1 %<br>DDVP 0.5 % | " | Shell Company (Hellas)<br>2 El. Venizelou Ave.<br>Kaliethea-Athens |
| | | | | | |
| 15. Teza Spray extra | " | Spray | Dursban 1 %<br>Pyrethrins 0.5 %<br>Diazinon 1 % | " | Brattits Co.<br>150 Tatoiou, Athens |
| | | | | | |

**7. Greece (GRC)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| 16. Black Flag Aerosol | Cockroaches, Ants and Flies, Mosquitoes | Spray | DDVP 0.16 %<br>Pyrethrins 0.02 %<br>Bromophos Methyl 0.8 % | POISON | Labropoulos Bros.<br>12 Ailianou St. Athens |
| | | | | | |
| 17. Neo-Shelltox with Vapona Aerosol | Flying Insects (Flies, Mosquitoes etc.) | Spray | DDVP 0.6 % | " | Shell Co. (Hellas)<br>2 Venizeloy St.<br>Kalithea-Athens |
| | | | | | |
| 18. Nepin | " | Spray | Neopinamin 0.26 %<br>Pyrethrins 0.10 %<br>M.G.K. 261 1.10 % | " | Chemi-Products (Hellas)<br>42 Themistokleous St.<br>Athens |
| | | | | | |
| 19. 007 Aerosol | " | Spray | DDVP 0.6 % | " | National Can Greece<br>25 Km National Road Athens-Corinth |
| | | | | | |
| 20. Red Star Aerosol | " | Spray | Neopinamin 0.3 %<br>M.G.K. 261 0.5 % | " | N. Petslavas AE<br>Nikodimoy-Voulis 11<br>Athens |
| | | | | | |
| 21. Sactif | " | Spray | Neopinamin 0.27 % | " | EBA AE<br>25 Alexandropoleos<br>Athens |
| | | | | | |
| 22. Finatox Aerosol Type C | " | Spray | DDVP 0.7 % | " | Fina AE<br>236 Syggrou Ave.,<br>Athens |

**7. Greece (GRC)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| | | | | | |
| 23. Spok Aersol | Flying Insects (Flies, Mosquitoes etc.) | Spray | DDVP 0.6 % | POISON | D.T.B. Hellas AE<br>1 Piraeus St., Athens |
| | | | | | |
| 24. Raid-2000 | " | Spray | Pyrethrins 0.15 %<br>Neopynamin 0.35 % | " | S.C. Johnson and Son (Hellas) EPE<br>Aspropygos-Attica |
| | | | | | |
| 25. Scorotoe | Moths | Solution | Perthane 3 % | " | Agrochimiki EPE<br>24 EM. Mpenaki St.<br>Athens |

## A.8. HUNGARY (HUN)

No contribution submitted.

## A.9. Italy (ITA)

9. **Italy (ITA)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| 1. Liquido Insetticida Concentrato Containing Malathion | Flies, mosquitoes, fleas, bedbugs, beetles and other insects. | Diluted in Water from 2 to 5 % | Malathion 50 % Pyrethrum 4 % Piperonylbutoxide 8% Solvents | Do not use on foods or on domestic animals. Do not use in closed quarters where people live. Inflammable. | Stabilimento Chimico Farmaceutico Militare Via R. Giuliani 201 Firenze. |
| | | | | | |
| 2. Liquido Insetticida Concentrato Containing Bioalletrine | All insects. | Diluted in water to 4 %. | Bioallethrin 3.3 % Piperonylbutoxide 33,3 % Solvents and emulsifier. | " | " |
| | | | | | |
| 3. Insetticida Pronto All'uso con Pyrethrum E Piperonylbutoxido | All insects | Ready for use. | Pyrethrum 0.6 % Piperonylbutoxide 0.6 % Citronella 2 % Solvents. | " | " |
| | | | | | |
| 4. Malmed L 50 | Flies and mosquitoes | Emulsion concentrate to be diluted in water 2 % | Malathion 50 % | Do not use on foods or domestic animals. Do not use in closed quarters where people live. | Agrimont S.P.A. Linea igiene pubblica Via S. Teresa, 23 Tel. 06/865761-861995-00198 Roma |
| | | | | | |
| 5. Demos L 40 | Flies and ground insects | Emulsionable in water 0.5-5% | Dimethoate 32 % Dichlorvos 8 % | " | " |

9. **Italy (ITA)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| | | | | | |
| 6. Demos N.F. | Flies and ground insects | Emulsionable in water 0.5-5% | Dimethoate 32 %<br>Pyrethrum 1,2 %<br>Piperonylbutoxide 2,4% | " | Agrimont S.P.A.<br>Linea igiene pubblica<br>Via S. Teresa, 23<br>Tel. 06/865761-<br>861995-00198 Roma |
| | | | | | |
| 7. Slam C | Larvae of flies. | Diluted in water to 1-2% | Azothoate 10 % | Toxic if ingested, inhaled or absorbed through skin. | " |
| | | | | | |
| 8. Blacard 50 P B | Beetles. | Powder soluble in water 1% | Carbaryl 50 % | Normal precautions required by insecticides. | " |
| | | | | | |
| 9. Blacared 5 P | Beetles. | Dried powder ready for use 2g/m². | Carbaryl 5 % | " | " |
| | | | | | |
| 10. Tanone | Mosquitoes. | Diluted in water to 1% | Phenthoate 50 % | " | " |
| | | | | | |
| 11. Solfac EW | All insects. | Diluted in water to 1 % | Cyfluthrin 5 %<br>Solvents. | " | Sici S.P.A.<br>Via Torino, 41<br>Tel. 06/4742941 Roma |
| | | | | | |
| 12. Solfac combi | Flies and mosquitoes | Diluted in water to 4 % | Cyfluthrin 2 %<br>Fenthion 47,7 % | " | " |
| | | | | | |
| 13. Skeetal | Mosquitoes, Larv*Ae.* | Diluted in water. | Living spores of Bacillus thuringiensis, | Toxic; do not use on foods. | " |

9. **Italy (ITA)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| 14. Baytex 50 Bayer | Flies and mosquitoes | Diluted in water to 4 % | Mercaptofos 43 % DDVP 5 % inert ingredients 47 % | Do not use on foods or on animals | For Northern Italy: Leica-Via dei Mulini, 24-Forli, For Southern Italy: Sici-Via Torino41 Tel.06/4742941 Roma |
| | | | | | |
| 15. Baygon EC | Cockroaches and other insects | Diluted in water from 2 to 5% | 2-Isopropoxyphenyl-N-methylcarbamate (Propoxur). | Do not use on foods or on animals. Do not use in closed quarters where people live. | " |
| | | | | | |
| 16. Baygon liquido (Liquid Baygon) | Cockroaches and other parasites | Ready for use in refined and deodored petrol | " | Toxic if inhaled or absorbed through skin. | 2 |
| | | | | | |
| 17. Baygon Polvere (Baygon-Powder) | Cockroaches and parasites. | By spreading on the ground. | " | Toxic if absorbed through skin. | " |
| | | | | | |
| 18. Baygon Spray | Flying and crawling insects. | By spraying. | " | Toxic if inhaled | " |
| | | | | | |
| | | | | | |
| 19. Soital 50 | Flies, horseflies, moths, mosquitoes and gnats. | Diluted in water to 2%. Can be sprayed with a sprinkling apparatus on internal or external walls. | Pyrethrum 25 %; Tetramethrine, Piperonylbutoxide; MGK; Solvents; Propellents and | Do not use on foods. | Sici-Via Torino 41 Tel. 06/4742941-Roma |

9. **Italy (ITA)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| | | | aromatic substances. | | |
| | | | | | |
| 20. Pyrethrum | Flies, mosquitoes, gnats and cockroaches. | Emulsionable in water 4 %. | Pyrethrum; Piperonylbutoxide; Emulsionants and Mineral oil. | Do not use on foods or on animals | Bianchedi-Via dei Colli Portuensi 139 Tel. 06/5349500-Roma |
| | | | | | |
| 21. Reldan 24/E | All insects. | Diluted in water from 2 to 5% | 0,0-Dimethy l0-Chlorpyrifos Methyl. | Normal precautions to be used with insecticides. | " |
| | | | | | |
| 22. Reldafos | All insects. | Diluted in water 4 %. | Chlorpyrifos-Methyl, Neopinamin, Piperonylbutoxide, Solvents and emulsionants. | Normal precautions to be used with insecticides. | " |
| | | | | | |
| 23. Dursban Cy | All insects. | Emulsionable in water to 1 % | Chlorpyrifos 46 % Cypermethrin 4,6 % Solvents and emulsionants. | Toxic to fishes | " |
| | | | | | |
| 24. Formiclor 80 | Flies, mosquitoes and ground insects. | Emulsionable in water to 5 % | Pyrethrine, Piperonylbutoxide, Methoxichlor, Diazinon, solvents and emulsionants. | Toxic if ingested, inhaled or absorbed through skin. | ZUCCHET S.P.A., Via Pian Due Torri 52 Tel. 06/5270841 00146 Roma |
| | | | | | |
| 25. Formiclor 40 | Flies, mosquitoes | Emulsionable in water | Diazinon 40 % | Do not use on foods or | ZUCCHET S.P.A., Via |

9. **Italy (ITA)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| | and ground insects | to 5% | Pyrethrum 2 %<br>Piperonylbutoxide 4%<br>Solvents and emulsionants. | domestic animals. Do not use in closed quarters where people live. | Pian Due Torri 52<br>Tel. 06/5270841<br>00146 Roma |
| | | | | | |
| 26. Formiclor 18 | Flies, mosquitoes, fleas, lice, moths, ants and beetles. | By spraying | Pyrethrum 25 %, Piperonylbutoxide, solvents, antioxidants and aromatic substances. | Inflammable, toxic in closed quarters and on foods. | " |
| | | | | | |
| 27. Muscaton 50 | Flies, mosquitoes, fleas and other insects. | Emulsionable in water 0,5-4% | Malathion 30 gr.<br>Rogor 20 gr.<br>Solvents and emulsionants 50 gr. | Toxic if inhaled or absorbed through skin. | " |
| | | | | | |
| | | | | | |
| 28. Nurelle 56EC | Flies, mosquitoes, fleas, beetles, bugs. | Diluted in water from 1 to 2 %. | Cypermethrin to 90%, 5,62 gr.<br>Emulsionants and solvents 94,38 gr. | Normal precautions to be used with insecticides. | M. Bioanchedi S.r.l.<br>Viale dei Colli Portuensi 139<br>00151-Roma |
| | | | | | |
| 29. Keniatox per Industrie Alimentari (Keniatox for food factory) | All flying and ground insects. | Emulsionable in water. Can be sprayed with a sprinkling apparatus. | Piperonylbutoxide; Pyrethrum. | Toxic if inhaled or absorbed through skin. | COOPER Italiana |

9. **Italy (ITA)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| 30. Famide Spray | All flying and ground insects. | By spraying. | Dioxacarb 50 gr. | Toxic if inhaled | Ciba-Geigy<br>Tel. 02/96541<br>Origgio (VA). |

## A.10. Netherlands (NLD)

10. **Netherlands (NLD)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| | | | | | |
| 1. PREMISE gel | Cockroaches | Ready-to-use | Imidacloprid | Pest Control operator should be protected by gloves | Bayer Nederland Bv<br>Postbus 105<br>6800 AC Arnheim<br>THE NETHERLANDS |
| | | | | | |
| 2. GOLIATH gel | Cockroaches | Ready-to-use | Fipronil | Pest Control operator should be protected by gloves | Aventis Env. Sc.<br>Postbus 147<br>4900 AC Oosterhout<br>THE NETHERLANDS |
| | | | | | |
| 3. MIEREN MIDDEL Bayer | Ants | Dust on and underneath floors, behind skirtingboards, tubin, radiators, etc. | Foxim | Avoid contact | Bayer Nederland Bv<br>Divisie Agro Chemie<br>Postbus 105<br>6800 AC Arnheim<br>THE NETHERLANDS |
| | | | | | |
| 4. MEPROS BAIT BOX | Ants | Place bait-box on directly ant-streets | Trichlorfon | | CAMBRIA BV<br>Industrieweg 1<br>5531 AD Bladel<br>THE NETHERLANDS |
| | | | | | |

10. **Netherlands (NLD)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| 5. SOLFAC Liquid | Cockroaches Flies | Emulgate the emulsion concentrate in water (0,8%) | Cyfluthrin | Wear mask, gloves and other protective clothing remove all foodstuff; clean afterwards carefully contaminated kitchen-utensils and table | BAYER HOLLAND BV<br>Argo-Chemie Veterinair<br>Postbus 9217<br>6800 HW ARNHEM<br>THE NETHERLANDS |
| | | | | | |
| 6. EMPIRE 20 | Cockroaches and other crawling insects | Emulsion concentrate/ organic phosphorus connection (1% in water) | Chlorpyrifos | Wear mask, gloves and other protective clothing remove all foodstuff; clean afterwards carefully contaminated kitchen-utensils and table | RIWA BV<br>Schapenweide 6<br>Postbus 2280<br>4800 CG BREDA<br>THE NETHERLANDS |
| | | | | | |
| 7. DETMOL CONCEN TRAAT DUd | Cockroaches and other crawling insects | Emulsion concentrate-combination (2-4% in water) | Chlorpyrifos | Wear mask, gloves and other protective clothing remove all foodstuff; clean afterwards carefully contaminated kitchen-utensils and table | RIWA BV<br>Schapenweide 6<br>Postbus 2280<br>4800 CG BREDA<br>THE NETHERLANDS |
| | | | | | |
| 8. BAYGON Ants bait box | Ants | Place open box several days in same spot (Place bait-box on "ant-street") | Foxim | | BAYER BV<br>Energieweg 1<br>3641 RT MIJDRECHT<br>THE NETHERLANDS |
| | | | | | |

10. **Netherlands (NLD)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| 9. BAYGON Ants powder | Ants | Strew the entry of ant's nest (mostly between tiles). Can be mixed with water (25 g in 5 liter) | Foxim | Avoid contact | BAYER BV<br>Energieweg 1<br>3641 RT MIJDRECHT<br>THE NETHERLANDS |
| | | | | | |
| 10. MAXFORCE Pharaoh's ant bait box | Pharaoh's ants | Place bait box near "ant-street" or places with a lot of ants. 1 or 2 bait boxes per 10 meters. | Hydramethylon | | ROUSSEL UCLAF ENVIRONMENTAL HEALTH NV<br>Colonel Bourgstraat 128<br>B-1140 BRUSSEL<br>BELGIUM |
| | | | | | |
| 11. Aircraft desinsectant | Flying insects | Sprayer, ready for use | 2%d-Phenothrin | Prevent direct contact and inhalation. Cover all foodstuff and clean all contaminated kitchen-utensils and tables | DENKA INTERNATIONAL<br>Postbus 337<br>3770 AH BARNEVELD<br>THE NETHERLANDS |
| | | | | | |

## A.11. NORWAY (NOR)

**No contribution submitted.**

## A.12. Portugal (PRT)

12. **Portugal (PRT)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| | | | | | |
| 1. Certi-fog | Mosquitoes, flies, cockroaches, ants | Termal Fog Generator | Pyrethrins 0,3 %<br>Piperonylbutoxide 1,75% | Should be used only by specially trained personnel.<br>Exterminator should be protected by mask and gloves.<br>Avoid contact with foodstuff.<br>Clean contaminated parts of the body with soap.<br>Combustible. | Certified<br>Av. Conselheiro Fernando de Sousa Nr. 19-10°-Esq.<br>Lisboa |
| | | | | | |
| 2. Neo Insecticida | Flies, mosquitoes, bed bugs, fleas and mites | Sprayer ready for use. | Dichlorvos 2 %<br>Piperonylbutoxide 3%<br>Neo-pynamin 0,3 % | Avoid inhalation of vapors. Avoid skin contact.<br>Do not spray on foodstuff, animals and plants. | Laboratorio Militar de Produtos Quimicos e Farmacêuticos<br>Av. Alfredo Bensaude<br>Lisboa |
| | | | | | |
| 3. Baygon Liquid | Cockroaches, ants, silverfishes, earworms, spiders,fleas, bedbugs, ticks, crickets, flies, gnats, mites and wasps. | Ready for use. | Propoxur 1,0 %<br>Dichlorvos 0,5 % | Exterminator should be protected by mask and gloves.<br>Remove or cover all foodstuff.<br>Colinesterase inhibitor.<br>Do not contaminate. | Bayer Portugal SARL<br>Rua Sociedade Farmacêutica n° 3-4° |
| | | | | | |

12. **Portugal (PRT)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| 4. Baygon Powder | Cockroaches, ants, silverfishes, earworms, spiders, fleas, bedbugs, ticks, crickets, flies, gnats mites and wasps | Powder ready for use. | Porpoxur 1 % | Exterminator should be protected by mask and gloves.<br>Remove or cover all foodstuff.<br>Colinesterase inhibitor.<br>Do not contaminate. | Bayer Portugal SARL Rua Sociedade Farmacêutica n° 3-4° Lisboa |

## A.13. POLAND (POL)

No contribution submitted.

## A.14. Spain (ESP)

14. **Spain (ESP)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| 1. Liquid insecticide immediate action ZZ-33 N.O.C.: 6840-33-1399015 | Flying insects | ULV-fogging machine | Natural Pyrethrins 0,3% 30 g/L Piperonyl Butoxide 3% 30 g/L | Do not spray directly on foodstuff, avoid inhalation; flammable liquid. Wear protective clothing. Avoid inhalation. | Zelnova S.A. Reg. D.G.F.P.S. No 130 Ins. Reg. G.S.A. No 3700159/PO-01624 |
| | | | | | |
| 2. Liquid insecticide imediate action massocide light | Crawling and flying insects | Cold or heat fogging | Pyrethrum 25% 16 g/L Piperonyl Butoxide 30 g/L | Do not spray directly on foodstuff, avoid inhalation; flammable liquid. Wear protective clothing. Avoid inhalation. | C.Q. Masso S.A. Reg. D.G.F.Y.M. No 1648 Ins. Reg. G.S.A. No 3700316/B-02537 |
| | | | | | |
| 3. Liquid insecticide compound ZZ-44 | Flies, moths, mosquitoes, beetles. | Cold fogging or sprayer ready to use. | Natural Pyrethrins 3 g/L Piperonyl Butoxide 3% heavy mineral oil. | Do not fog on foodstuff. Avoid inhalation. | Zelnova S.A. Reg. D.G.F.P.S. No 133 Ins Reg. G.S.A. No 3700159/PO-01947 |
| | | | | | |
| 4. Liquid insecticide residual action Multispray N.O.C. 6840-33-1899286 | Flying and crawling insects, bed bugs. | Cold and thermal fogging; back-pack sprayer. | Bioallethrin 0,04% Bioresmethrin 0,06% Piperonyl Butoxide Lindane 1% | Not to be used in presence of foodstuff; avoid inhalation, clean carefully conta-minated parts of the body with soap especially after contamination with concentrates. | Zelnova S.A. Reg. D.G.F.P.S. No 12624 Ins. |

14. **Spain (ESP)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| | | | | | |
| 5. Liquid insecticide Residual Baygon Ol | Cockroaches, and flying insects | Spray 0,75 - 1,5 ml/10 $m^3$ against flying insects, 25 - 50 ml/$m^{2.}$ | Propoxur 1%<br>Dichlorvos 0,5% | Not to be used in presence of foodstuff; avoid inhalation, clean carefully contaminated parts of the body with soap. Flammable liquid. | Bayer S.A.<br>Reg. D.G.F.P.S.<br>No 239 INS. |
| | | | | | |
| 6. Lac insecticide Clorpirifos G.M.B. | Crawling insects, esp. cockroaches | Sprayer ready to use. | Chlorpyrifos 3%<br>Dichlorvos 0,5% | Not to be used in presence of foodstuff; avoid inhalation, clean carefully contaminated parts of the body with soap. Flammable liquid. | G.M.B.<br>International |
| | | | | | |
| 7. Lac insecticide Clorpirifos Masso | Crawling insects, esp. cockroaches | Sprayer ready to use | Chlorpyrifos 25 g/L<br>Cypermethrine 5 g/L | Not to be used in presence of foodstuff; avoid inhalation, clean carefully contaminated parts of the body with soap. Flammable liquid. | C.Q. Masso S.A.<br>Reg. D.G. de P. de C.<br>No 91-30-00172 |
| | | | | | |
| 8. Concentrate liquid insecticide Solfac EW 050 | Cockroaches, flies, flying pests, mosquito larvae | Sprayed onto places where insects rest, hide or travel; use 80 ml/10 L water or 40 L/100 $m^2$ water surface against mosquito larv*Ae.* | Cyfluthrin 5% | Clean carefully contaminated parts of the body with soap, especially after contact with suspension concentrate. Do not spray on foodstuff. Avoid inhalation of spray mist. | Bayer S.A.<br>Reg. D.G.S.P.<br>No 37-04124 |

14. **Spain (ESP)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| | | | | | |
| 9. Concentrate liquid insecticide Baygon EC 20 | All insects | Suspend in water, spray 250-500 ml/$m^2$ | Propoxur 20% | Do not spray directly on foodstuff; clean carefully contaminated parts of the body with soap especially after contact with WP or concentrates. | C.Q. Masso S.A. Reg. D.G. DE F Y M No 1646 INS |
| | | | | | |
| 10. Liquid insecticides organosforate Massocide S-NP | Flies, mosquitoes (adults & larvae), cockroaches | For indoor and outdoor use. | Sumithion 500 g/L Neo-Pynamin 50 g/L | Flammable liquid. Do not spray directly on electric devices. Clean carefully contaminated parts of the body with soap, especially after contact with concentrates. Avoid inhalation of spray mist. Do not spread on hot surfaces. | C.Q. Masso S.A. Reg. D.G. DE F Y M No 1646 INS |
| | | | | | |
| 11. Liquid insecticide Microencapsulated | Crawling insects | Concentrate to be diluted with water ( 2 - 4%) and sprayed on surfaces, where arthropods may rest, hide or travel | Sumithion 20% | Do not spray directly on foodstuff. | C.Q. Masso S.A. Reg. D.G. S.A.Y.P.C. No 37.00316/B-03342 |

14. **Spain (ESP)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| | | | | | |
| 12. Powder insecticide Baygon | All insects | For use in areas, where liquid formulation is not recommended. | Propoxur 1% | Do not spray on foodstuff, use protective clothing and clean carefully contaminated parts of the body with soap. | Bayer S.A.<br>Reg. D.G.F.Y.P.S.<br>No 202 Ins |
| | | | | | |
| 13. Wetable powder insecticide Ficam W | Cockroaches | For use in cockroach infested areas as a 0,3-0,6% solution | Bendiocarb 80% | Do not spray on foodstuff; use protective clothing and clean | C.Q. Masso, S.A. |
| | | | | | |
| 14. Wetable powder insecticide Solfac WP 10 | Crawling and flying insects | To be sprayed in an amount of 50 ml/$m^2$ against crawling and insects and 100 ml/$m^2$ against flying insects. | Cyfluthrin 10% | Avoid inhalation of spray mist. Do not spread on foodstuff. Clean carefully contaminated parts of the body with soap. | Bayer S.A.<br>Reg. D.G.F.M<br>No 1295 INS<br>Reg. EN M.A.P.A.<br>No 1635/8932 |
| | | | | | |

## A.15. TURKEY (TUR)

General issues to be considered when using insecticides are as follows:

a. Insecticides must not be applied on foods.
b. Smoking and eating shall be prohibited during insecticide application.
c. Plastic gloves, protective clothing and mask must be used during contact with insecticides and during application.
d. In case of contact, eyes and skin must be cleaned with plenty of water.
e. Empty containers must be disposed properly after cleaning.
f. Insecticide containers must be stored preferably in dark, dry and cool places, and in their original package, as recommended by its manufacturer.
g. Insecticides must be stored in places away from foods and out of reach of children.
h. In case of toxication gastric washing must be applied.

15. **Turkey (TUR)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| | | | | | |
| 1. Mostyn BA 25 | Flies, Mosquitos, Cockroaches, Lice, Fleas | Thermal fogging and with ULV | 105 g/L Permethrin, 3.5 g/L S-Bioallethrin | General | Ulfog |
| | | | | | |
| 2. Solfac UL 15 | Stable flies, sand flies, mosquitos, house flies, cockroaches | All types of fogging apparatus | 1% Cyfluthrin, 0,3% Pynamin forte, 5% Piperonyl Butoxide | General and producers of beekeeping shall be warned prior to application | Bayer |
| | | | | | |
| 3. D DVP55 EM | Mosquitos, house flies, cockroaches | All types of fogging apparatus | Dichlorvos | General | Koruma Tarum |
| | | | | | |
| 4. Imperator | Harmful insects on fruits and vegetables | | Cypermethrin | General | Turco-Hoechst Industries |
| | | | | | |
| 5. Special Mixture | Cockroaches | Prepared mixture shall be applied to dark and moist places | 36% Borax, 16% Flour | General | |
| | | | | | |
| 6. Mostyn M25 T | Mosquitos, bees, flies, cockroaches, fleas, ants, ticks, beetles | All types of fogging apparatus. Could be used by mixing with water, fuel oil or kerosene | 10% Tetramethrin, 5% d-Phenothrin | General | Ulfog Insecticides |
| | | | | | |
| 7. Fondol M EC 360 | Mosquitos, bees, flies, cockroaches, | Fogging apparatus | 360 g/L Methyl-Parathion | General and in calm weather conditions | |

15. **Turkey (TUR)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| | | | | | |
| | fleas, ants, ticks, beetles | | | | |
| | | | | | |
| 8. Poli DDVP 50 EL | Mosquitos, bees, flies, cockroaches, fleas, ants, ticks, beetles | Sprayed with pump | 550 g/L Dichlorvos | General | Polisan Chemical Industries |
| | | | | | |
| 9. Diazol 20 EC | Mosquitos, bees, flies, cockroaches, fleas, ants, ticks, beetles | Sprayed with pump | 185 g/L Diazinon | General | |
| | | | | | |
| 10. Icon IE | Cockroaches, fleas, bedbugs | Sprayed with pump | 360 g/L Methyl-Parathion | General | Zeneca |
| | | | | | |
| 11. K-Othrine SC 50 | House flies, mosquitos, cockroaches, ants, wasps, fleas, bedbugs, clothes moths | Sprayed with pump | 50 g/L Deltamethrin | General | AgrEvo (Hoechst-Schering) |

## A.16. UNITED KINGDOM (GBR)

### Precautions - Use of Insecticides

1. Policy. UK military policy on the use of pesticides is contained in the following Joint Service Publications (JSP):
   a. JSP 371. Joint Service Manual on Pest Control.
   b. JSP 375. MOD Health and Safety Handbook.
   c. JSP 424. Guidance Notes for MOD COSHH Assessors.
   d. JSP 418. MOD Environmental Manual

2. Summary of General Safety Precautions. As a general principle, insecticides are only to be employed where other, less invasive techniques of control (such as environmental measures) are not considered to be effective.
   a. Only officially approved insecticides are to be used.
   b. All insecticides approved specifically for MOD use will, wherever practicable, carry the statutory approval of the Health and Safety Executive/Ministry of Agriculture, Fisheries and Food.
   c. The local purchase of insecticides is prohibited.
   d. Pesticides may only be applied by personnel who have received appropriate training. The minimum acceptable level for new technicians is successful attendance on the Unit Environmental Health Duties Course.
   e. There is to be proper accounts kept of insecticide storage, issue, use and disposal.
   f. Insecticides are to be stored in a secure, hazard-marked store, and kept in their original packaging. Hazard/risk assessments and manufacturers' safety data sheets are to be readily available.
   g. During transportation, insecticides are to be isolated from personnel by using a vapour-proof container.
   h. No individual is to be employed in spraying residual insecticides for more than 5 hours in any working day.
   i. Individuals suffering from certain skin complaints, including cuts and grazes, are not to be employed on insect control duties. If in doubt, medical advice should be sought.
   j. Personnel using insecticides are to have washing (and ideally showering) facilities readily available.
   k. Personnel are not allowed to eat, drink or smoke when using insecticides.
   m. When spraying near electrical power supplies, care should be taken to switch off beforehand, and to avoid spraying, electrical power sockets. When spraying in kitchens, appliances should be allowed to cool beforehand.
   n. Foodstuff, and food preparation surfaces, are to be protected from insecticides.
   o. Personnel are not to be directly sprayed with insecticides.
   p. Only sufficient quantities of insecticides are to be mixed for the task in hand.
   q. The minimum acceptable personal protective equipment compatible with safe residual insecticide use is as follows:

(1) Appropriate coverall with hood, and which is close-fitting at wrists and neck and boots as necessary.
(2) Non-absorbent protective gloves.
(3) Appropriate respiratory protective equipment } A full space mask with filter canister may be preferred
(4) Goggles }

r. Redundant insecticide and empty or damaged containers are to be disposed of in such a manner as to preclude contamination of the environment. Containers are not to be reused.

16. **United Kingdom (GBR)**

| Ser | Agent | Use | Mode of Application | Effective compounds | Remarks and Precautions | Manufacturer/Supplier |
|---|---|---|---|---|---|---|
| | | | | | | |
| 1. | Cytrol Forte 40 H1/6840-99-125-9922 | Crawling insects | Residual spray, applied using pneumatic sprayer | Cypermethrin | General | Pelgar International Ltd |
| | | | | | | |
| 2. | Insecticide Borax (Nippon) H1/6840-99-083-0746 | Garden Ants | Applied from tube | 5,5% W/W Borax | General | Vitax Ltd |
| | | | | | | |
| 3. | Reslin Premium H1/6840-99-131-0286 | Flying insects | Diluted with water or kerosene, applied as a fog, using a thermal fogging machine for rapid knockdown of flying insects | 1,7% W/W S-Bioallethrin 11% Permethrin | General If used with kerosene as diluent, there is an attendant fire risk, especially if used in confined spaces | AgrEvo Environmental Health Ltd |
| | | | | | | |
| 4. | Coopex Maxi Smoke Generator H1/6840-99-140-8868 | Flying insects | Insecticidal "Smoke" generator for multipurpose disinfestation in enclosed spaces | 13,5% WT for WT Permethrin | General | AgrEvo Environmental Health Ltd |
| | | | | | | |
| 5. | Coopex Insect Powder H1/6840-99-869-0200 | Crawling insects | Powder applied direct from container or via dust gun | Permethrin | General | AgrEvo Environmental Health Ltd |
| | | | | | | |
| 6. | Alfracron H1/6840-99-430- | Flies | Residual spray, applied using pneumatic sprayer | Azamethiphos | General | AgrEvo Environmental Health Ltd |

16. **United Kingdom (GBR)**

| Ser | Agent | Use | Mode of Application | Effective compounds | Remarks and Precautions | Manufacturer/Supplier |
|---|---|---|---|---|---|---|
| | | | | | | |
| | 0333 | | | | | |
| 7. | Insecticide aerosol H1/6840-99-978-8469 | Flying insects | Knockdown aerosol spray | 1,9% W/W Pyrethroid and Piperonyl Butoxide | General | Aerosols International Ltd |
| | | | | | | |
| 8. | Pif-Paf Crawling Insect Killer H1/6840-99-983-6023 | Crawling Insects | Residual aerosol spray | Bioallethrin and Permethrin | General<br>No restrictions on supply | Wellcome Foundation Ltd. |
| | | | | | | |
| 9. | Drione Hl/6840-99-869-4122 | Broad spectrum of arthropods | Applied as gel from container | 1% Pyrethrin, 10% Piperonyl butoxide and 4% amorphous silica gel | General | Wellcome Foundation Ltd. |
| | | | | | | |
| 10. | Actellic 25EC Hl/6840-99-869-4123 | Crawling insects | Residual spray, applied using pneumatic sprayer | 25% Pirimiphos methyl | General | Zeneca Public Health Ltd |
| | | | | | | |
| 11. | Ficam W H1/6840-99-225-8194 | Crawling insects | Residual spray, applied using pneumatic sprayer | Bendiocarb | General | AgrEvo Environmental Health Ltd |
| | | | | | | |
| 12. | Coopex WP Hl/6840-99-225-2372 | Crawling insects | Residual spray, applied using pneumatic sprayer | 25% Permethrin | General | AgrEvo Environmental Health Ltd |
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16. **United Kingdom (GBR)**

| Ser | Agent | Use | Mode of Application | Effective compounds | Remarks and Precautions | Manufacturer/Supplier |
|---|---|---|---|---|---|---|
| | | | | | | |
| 13. | Abate HI/6840-99-430-7648 | Aquatic larvae | Impregnated sand granules, applied by hand | 1% SG Temephos | General | AgrEvo Environmental Health Ltd |
| 14. | Coopex Mini Smoke Generators HI/6840-99-638-4327 | Flying insects | Insecticidal "Smoke" generator for multipurpose disinfestation in enclosed spaces | 13,5% WT for WT Permethrin | General | AgrEvo Environmental Health Ltd |
| | | | | | | |
| 15. | Empire 20 HI/6840-99-869-0197 | Crawling insects | Residual spray, applied using pneumatic sprayer Approved for crack and crevice treatment only | Microencapsulated 20% WW Chlorpyrifos | General Not approved for general surface treatments | Dowelanco Ltd |
| | | | | | | |
| 16. | One Shot HI/6840-99-220-4227 | Flying insects | One-shot hand-held aerosol for "blocks away" disinsection of aircraft | 2% d-Phenothrin | General | Anteco |
| | | | | | | |
| 17. | Maxforce Gel HI/6840-99-869-4124 | Cockroaches | Gel, applied using caulking gun | Hydramethylnon | General | AgrEvo Environmental Health Ltd |

## A.17. UNITED STATES (USA)

### PRECAUTIONS AND OTHER PERTINENT INFORMATION

1. All pesticides, insecticides, rodenticides, insect repellents, fungicides, etc., are toxic chemicals which can cause injury or death to humans when improperly used.

2. Most of the chemicals listed in this compilation should be only by trained and qualified personnel.

3. Rates of application and percent concentration should be determined by competent professional personnel and pesticide use should be supervised.

4. Every attempt should be made to inform physicians of the planned use of pesticides in their areas so that first aid may be provided if signs and symptoms of pesticide poisoning occur and specific therapy can be obtained through professional medical sources before an emergency arises. In any case, all pertinent information relating to pesticide accidents, injuries or death must be furnished to the treating physician.

5. Pesticide applicator personnel must be provided with protective clothing, personal protective devices and eauipment when working with pesticides, which require the use of personal protective equipment.

6. Organophosphorous insecticides (e.g. Dursban) act as inhibitors of cholinesterase enzymes. Most signs and symptoms of poisoning are secondary to cholinesterase inhibitions. Signs and symptoms: headache, blurred vision, weakness, nausea, salivation, sweating, diarrhea, miosis, discomfort in the chest, tearing, convulsions, and coma. In severe cases, artificial respiration may be required and should be given until cyanosis is overcome. Then give atropine sulfate, 3 to 4 mg., intravenously, repeated at 5 to 10 minute intervals until the signs of atropinization appear, followed by 2-PAM (2-pyridine aldezime methochloride or methiodide) intravenously and slowly, 1 gram for adults and 0.25 grams for infants. Decontamination of skin, stomach, and eyes as indicated with symptomatic treatment.

7. Label precautions and application instructions must be adhered to. Each pesticide is only registered for use against pests identified on its label and in the manner specified.

8. Remember, in the U.S. and its territories, **the pesticide label is the law**.

9. Recording, Reporting, and Archiving Pesticide Use during Contigency Operations: Paragraph B.3.h., DoD Instruction 4150.7, "DoD Pest Management Program," April 22, 1997 requires that pesticide use during military operations be recorded and archived. Pesticide applicators must

record all pesticide applications, excluding arthropod skin and clothing repellents, performed during military operations, using DD Form 1532-1, "Pest Management Maintenance Record," or a computer generated equivalent. Reporting pesticide use and archiving pesticide use shall be performed in accordance with U.S. Military Service procedures. Personal-use pesticide applications (including repellents) are exempt from reporting requirements.

10. Applying Pesticides in Foreign Countries. During contingency operations, U.S. forces should follow the Final Governing Standards (FGSs) for that installation's host country. These standards, which include pesticide applications, were developed by comparing an overseas environmental baseline (based on U.S. laws and regulations) with the host nation's standards. For countries without FGSs, or for operations outside a military installation, you should adhere to U.S. EPA requirements.

11. For operations and exercises, pesticide applicators should dispose of pesticides, rinse water, and pesticide containers in accordance with the U.S. or host-tenant agreements for that host country. If host-tenant or other agreements do not exist, you must adhere to the requirements of US regulations.

17. **United States (USA)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
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| | | | | | |
| 1. Bacillus thuringiensis Berliner var. israelensis (10.31%); (Summit B.t.i. Briquets); (100 briquets/bx); U.S. EPA Registration No. 6218-47 U.S. National Stock No. 6840-01-377-7049 | Mosquito Larvae | Apply as formulated. Manually apply one briquette for up to 100 sq. ft. of surface water regardless of depth. Application rate may have to be increased up to four times the normal in high organic level water. Break briquettes into portions for use in old tires, or other locations where water collects and remains for periods of time. | Bacillus thuringiensis Berliner var. isralensis | Avoid contact with eyes or open wounds. | Summit Chemical Co. Baltimore, MD<br><br>(Note: Supplier may vary according to contract procurement awards.) |
| | | | | | |
| 2. Bifenthrin (7.9%); (TalstarOne Multi-Insecticide); (1 qt container); U.S: EPA Registration No. 279-3206 U.S. National Stock No. 6840-01-525-6888 | Broad spectrum control of household, turf, ornamental plant pests, ticks, subterranean termite and adult mosquito control. | Mix with water, apply 0.33-1.0 oz per 1000 sq ft (0.02-0.06%). For general application using hand pressurized or power operated sprayers. Outdoor use. Apply outside as a residual. Do not apply water-based sprays in conduits, or electrical equipment because of the possible shock hazard. Do not use as a space spray. | Bifenthrin | Do not get in eyes, on skin or on clothing. Avoid breathing vapors or spray mists. Extremely toxic to fish. | FMC Corporation Philadelphia, PA<br><br>(Note: Supplier may vary according to contract procurement awards.) |

17. **United States (USA)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| | | | | | |
| 3. Cyfluthrin (11.8%); (Tempo SC Ultra); (240 ml bottle; 12 bottles/box;) U.S. EPA Registration No. 432-1363 U.S. National Stock No. 6840-01-313-7359 | Broad spectrum control of crawling, flying, stored product pests and wood destroying pests. | Dilute with water. Use hand pressurized or power operated sprayers. Use 8 millilitres of concentrate per 1000 sq. ft. in sufficient water to cover the area to be treated. For spot or crack and crevice application, mix 8 millilitres of concentrate in one gallon of water to make a 0.05% concentration or 16 millilitres of concentrate in one gallon of water to make a 0.10% concentration. | Cyfluthrin | Extremely toxic to fish and aquatic invertebrates. Harmful if swallowed, inhaled or absorbed through skin. Do not get in eyes, on skin or on clothing. Wear safety glasses, goggles, or face shield when handling undiluted material and wear a respirator when making general overhead treatment. | Bayer AG Montvale, NJ (Note: Supplier may vary according to contract procurement awards.) |
| | | | | | |
| 4. Cyfluthrin (10%); (Tempo Ultra WSP); (50 gram packets; 32 packets/box;) U.S. EPA Registration No. 432-1377 U.S. National Stock No. 6840-01-383-6251 | Broad spectrum control of crawling, flying, stored product pests and wood destroying pests. | Dilute with water. Use hand pressurized or power operated sprayers. Use 1 packet of concentrate per 1000 sq. ft. in sufficient water to cover the area to be treated. For spot/ crack and crevice application, use one packet of concentrate in one gallon of water for a 0.05% concentration or two packets of concentrate in one gallon of water for a 0.10% concentration. | Cyfluthrin | Harmful if swallowed, inhaled or absorbed through skin. Do not get in eyes, on skin or on clothing. Wear safety glasses, goggles, or face shield when handling undiluted material and wear a respirator when making general overhead treatment. | Bayer AG Montvale, NJ (Note: Supplier may vary according to contract procurement awards.) |

17. **United States (USA)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
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| 5. Cypermethrin (40%) (Demon WP); (454 grams -1 lb jar); U.S. EPA Registration No. 100-990 U.S. National Stock No. 6840-01-390-4822 | Broad spectrum control of crawling and flying pests. | Dilute with water. Do Not use with oil. Use hand pressurized or power operated sprayers. Used as general area, a general spot or crack and crevice treatment. Do not use in Food areas. One packet per gallon of water make a 0.10% concentration of active ingredient. Two packets per gallon of water makes a 0.20% concentration of active ingredient. | Cypermethrin | Do not get in eyes, on skin or on clothing. Avoid breathing vapors or spray mists. Extremely toxic to fish. | Syngenta Crop Protection, Inc Greensboro, NC<br><br>(Note: Supplier may vary according to contract procurement awards.) |
| | | | | | |
| 6. d-Phenothrin (2%); (Black Knight Roach Killer); (340.2 grams -12-oz can). U.S. EPA Registration No. 901-82 U.S. National Stock No. 6840-01-412-4634 | Mosquitoes, gnats, house flies | Apply as formulated. Use as a space spray for disinsection of aircraft in compliance with agricultural quarantine. Use at least 30 minutes prior to landing. Spray 10 grams (10 seconds) per 28.3 $m^2$ (1000 ft3). For indoor use in buildings, vans, ships, and tentage; close space to be treated. Ten seconds of spraying is ample for each 28.3 $m^3$ (1000 ft3). | Phenothrin | Ventilate area before re-entry. Harmful if swallowed | Airosol Company, Inc Neodesha, KS<br><br>(Note: Supplier may vary according to contract procurement awards.) |

17. **United States (USA)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
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| 7. Deltamethrin (0.05%); (Delta Dust); 454 grams (1 lb container); U.S. EPA Registration No. 432-772 U.S. National Stock No. 6840-01-431-3345 | Ants, bedbugs, bees, centipedes, cockroaches, fleas, scorpions, stored product pests, ticks, and wasps. | Apply as formulated. Do not use in food areas indoors. Use with hand or power duster, with a paint brush or by other suitable means to hiding and runway areas and other places where pests are found. Labelled for fleas and ticks in rodent burrows. | Deltamethrin | Avoid contact with skin, eyes or clothing. Extremely toxic to fish and aquatic invertebrates. | Bayer AG Montvale, NJ<br><br>(Note: Supplier may vary according to contract procurement awards.) |
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17. **United States (USA)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| | | | | | |
| 8. Fipronil (0.01%) (Combat) Quick Kill); (Large size; 8 stations/box; 12 box/pkg). U.S. EPA Registration No. 64240-34 U.S. National Stock No. 6840-01-224-1269 | Large size bait stations used for all species of household cockroaches. | Place bait stations where cockroaches have been seen. Use stickers to place bait stations on vertical surfaces. Replace all bait stations every 3 months. | Fipronil | Do Not store near food or food products. Wash thoroughly after handling. May be harmful if swallowed. | The Clorox Company Oakland, California<br><br>(Note: Supplier may vary according to contract procurement awards.) |

17. **United States (USA)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
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| 9. Fipronil (0.01%) (Combat) Quick Kill); (Regular size; 12 stations/box; 12 box/pkg). U.S. EPA Registration No. 64240-33 U.S. National Stock No. 6840-01-180-0167 | Regular size bait stations used for German Cockroaches | Place bait stations where cockroaches have been seen. Use stickers to place bait stations on vertical surfaces. Replace all bait stations every 3 months. | Fipronil | Do Not store near food or food products. Wash thoroughly after handling. May be harmful if swallowed. | The Clorox Co. Oakland, California<br><br>(Note: Supplier may vary according to contract procurement awards.) |
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17. **United States (USA)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
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| | | | | | |
| 10. Fipronil (0.01%) (Maxforce FC Ant Bait) Quick Kill); (96 stations/pkg). U.S. EPA Registration No. 432-1256 U.S. National Stock No. 6840-01-298-1122 | Use for Pharaoh and other common household ants: Argentine, Carpenter, Crazy, Pavement, Cornfield, Odorous House, Acrobat and Thief ant control. | Place bait stations where ants have been seen. Use stickers to place bait stations on vertical surfaces. May be used indoors or outdoors. Inspect and replace as needed. | Fipronil | Do Not store near food or food products. Wash thoroughly after handling. May be harmful if swallowed. | Bayer AG Montvale, NJ (Note: Supplier may vary according to contract procurement awards.) |
| | | | | | |
| 11. Fipronil (0.01%) (Maxforce FC Roach Killer Bait Gel Reservoir)(4 each 30 gram reservoirs/ box) Use w/syringe NSN 3740-01-483-3012 U.S. EPA Registration No. 432-1259 U.S. National Stock No. 6840-01-483-3065 | Apply as formulated for German, Brown-banded, American, Smokey-brown, and Oriental cockroach control | Apply spots or as beads in cracks and crevices indoors or outdoors. Rate is dependent upon the level of infestation and species. | Fipronil | Do Not store near food or food products. Wash thoroughly after handling. May be harmful if swallowed. | Bayer AG Montvale, NJ (Note: Supplier may vary according to contract procurement awards.) |

17. **United States (USA)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
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| | | | | | |
| 12. Fipronil (0.01%) (Maxforce FC Roach Killer Bait Gel Reservoir)(24 each 60 gram reservoirs/ box) U.S. EPA Registration No. 432-1259 U.S. National Stock No. 6840-01-471-5650 | Apply as formulated for German, Brown-banded, American, Smokey-brown, and Oriental cockroach control | Apply spots or as beads in cracks and crevices indoors or outdoors. Rate is dependent upon the level of infestation and species. | Fipronil | Do Not store near food or food products. Wash thoroughly after handling. May be harmful if swallowed. | Bayer AG Montvale, NJ<br><br>(Note: Supplier may vary according to contract procurement awards.) |
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17. **United States (USA)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
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| | | | | | |
| 13. Fipronil (9.1%) (Termidor SC) (4 each 78 oz bottles//box) U.S. EPA Registration No. 7969-210 U.S. National Stock No. 6840-01-483-3068 | For Subterranean Termite Control | For use ONLY by individuals licensed or registered by States/DOD to apply termiticide products. Can be used Pre-Construction and Post Construction. | Fipronil | Do Not store near food or food products. Wash thoroughly after handling. May be harmful if swallowed. | BASF Research Triangle Park, NC (Note: Supplier may vary according to contract procurement awards.) |
| 14. Fipronil (80.0%) (Termidor WG) (48 co/box) U.S. EPA Registration No. 7969-209 U.S. National Stock No. 6840-01-483-3072 | For Subterranean Termite Control | For use ONLY by individuals licensed or registered by States/DOD to apply termiticide products. Can be used Pre-Construction and Post Construction. | Fipronil | Do Not store near food or food products. Wash thoroughly after handling. May be harmful if swallowed. | BASF Research Triangle Park, NC (Note: Supplier may vary according to contract procurement awards.) |

17. **United States (USA)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
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| 15. Hydramethylnon (0.2%) (Siege Gel Bait) (12 ea 120 gram reservoirs/box) U.S. EPA Registration No. 241-313-9444 U.S. National Stock No. 6840-01-398-6799 | Apply as formulated for German, Brown-banded, American, Smokey-brown, and Oriental cockroach control | Apply spots or as beads in cracks and crevices indoors or outdoors. Rate is dependent upon the level of infestation and species. | Hydramethylnon | Do Not store near food or food products. Wash thoroughly after handling. May be harmful if swallowed. | Waterbury Companies, Inc Waterbury, CT<br><br>(Note: Supplier may vary according to contract procurement awards.) |
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17. **United States (USA)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
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| | | | | | |
| 16. Imidacloprid (0.50%) and Z-9-Tricosene (0.10%) (Maxforce Granular Fly Bait) (5 lb Container). U.S. EPA Registration No. 432-1375 U.S. National Stock No. 6840-01-518-5807 | Apply as formulated for filth fly control. | For outdoor use only. Bait should be scattered over specified fly feeding areas (or military equivalent sites) daily or as needed. Scatter bait (do not put in piles) at the rate of approximately 0.5 lb per 1,000 sq ft of fly feeding area. Distribute bait from container or other device. | Imidacloprid and Z-9-Tricosene | Do Not store near food or food products. Wash thoroughly after handling. May be harmful if swallowed. | Bayer AG Montvale, NJ (Note: Supplier may vary according to contract procurement awards.) |
| | | | | | |
| 17. Lamdacyhalothrin (10%); (Pestab); 40 tablets/container; U.S. EPA Registration No. 53883-70 U.S. National Stock No. 6840-01-431-3357 | Broad spectrum; Household, stored product, turf, ornamental plant pests, and mosquito adult control. | Mix with water. Use hand pressurized or power operated sprayers. One tablet per gallon of water makes a 0.015% spray, four tablets per gallon of water makes a 0.06% spray. For use as a general surface, spot application in and around buildings and structures and on various modes of transportation. May be applied to lawn areas and around residential buildings and similar sites. | Lamdacyhalothrin | May be fatal if swallowed. Harmful if inhaled or absorbed through skin. Causes eye irritation. Avoid contact with skin, eyes or clothing and breathing spray mist. | Control Solutions Pasadena, TX (Note: Supplier may vary according to contract procurement awards.) |
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17. **United States (USA)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
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| 18. Malathion (96.5%); (Fyfanon ULV); 5 gal can; U.S. EPA Registration No. 67760-34 U.S. National Stock No. 6840-01-169-1842 | Apply undiluted for adult mosquitoes and flies, except for thermal fog/fog use | For outdoor use only in ground or aerial ULV equipment. For application with ground equipment 2-4 oz/acre. For use with thermal fogs or fogs, apply 6-8 oz/100 gallons of finished solution. Label includes extensive directions for application, equipment calibration, and droplet size determination. Spray droplets may permanently damage paint on vehicles. | Malathion | May be fatal if swallowed. Harmful if inhaled or absorbed through skin. Causes eye irritation. Avoid contact with skin, eyes or clothing and breathing spray mist. | CHEMNOVIA Inc. Wayne, NJ<br><br>(Note: Supplier may vary according to contract procurement awards.) |
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17. **United States (USA)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
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| 19.<br><br>Methoprene (2.1%); (Altosid XR Briquettes); 220 briquettes/box; U.S. EPA Registration No. 2724-421 U.S. National Stock No. 6840-01-424-2495 | Mosquito larvae | Manually apply as formulated. Begin use at the start of the mosquito season. Do not apply to known fish habitats. Releases effective levels of methoprene for up to 150 days. Has no effect on pupal stage mosquitoes. Use one briquette per 200 sq. ft. for shallow depressions. For *Aedes* and *Psorophora*, use one briquette per 200 sq. ft. For *Culex, Culiseta*, and Anopheles, place one briquette per 100 sq. ft. For *Coquillettidia* and *Mansonia* in marshes, and water hyacinth beds, one briquette per 100 sq. ft. | Methoprene | No adverse reactions have resulted from human exposure during research or manufacture of this product. Avoid contact with eyes or clothing. | Wellmark International (Zoecon) Schaumburg, IL<br><br>(Note: Supplier may vary according to contract procurement awards.) |
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17. **United States (USA)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| | | | | | |
| 20. Methoprene (20%); (Altosid SR20 Liquid Larvicide (A.L.L.); 18.9 liter (2) 2.5 gal containers]; U.S. EPA Registration No. 2724-446 U.S. National Stock No. 6840-01-424-2493 | Mosquito larvae | Mix with water. Use hand pressurized or power operated sprayers. Must be applied to 2nd, 3rd, or 4th instar larvae, has no effect on pupal stage. Apply ¾ to 1 fl oz of A.L.L. in ½ to 5 gallons of water per acre of crop areas and intermittently flooded non-crop areas. A.L:L: may be mixed with sand and applied to areas of dense vegetation using granular equipment. | Methoprene | Causes moderate eye irritation. Avoid contact with eyes or clothing. | Wellmark International (Zoecon) Schaumburg, IL<br><br>(Note: Supplier may vary according to contract procurement awards.) |
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17. **United States (USA)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| | | | | | |
| 21. Methomyl Fly Bait (1% Methomyl and 0.25% Z-9 Tricosine); (Blue Streak/ Stimukil /Golden Malrin); 2.2 kg (5 lb) can; U.S. EPA Registration Nos. 270-255/53871-3/2724-274 U.S.National Stock No. 6840-01-183-7244 | Filth flies such as house flies. Apply as formulated. | Apply as formulated. For outdoor use only; apply at ¼ lb per 500 ft2 - do not put in piles. If necessary, apply daily. Do not allow food producing animals to have access to treated areas. Do not apply directly to water. | Methomyl and Z-9 Tricosine | Harmful if swallowed, inhaled or absorbed through skin. Avoid breathing dust. Avoid contact with skin, eyes, or clothing. Hazardous to birds and other wildlife. | BlueStreak - Farnham Livestock Products Phoenix, AZ/ Stimukil –Troy Biosciences Inc, Phoenix, AZ//Golden marlin - Wellmark International (Zoecon) Schaumburg, IL<br><br>(Note: Supplier may vary according to contract procurement awards.) |
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17. **United States (USA)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
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| | | | | | |
| 22. Naled solution concentrate, (87.4%); (Dibrom); 113.6 liter (30 gal) drum; U.S. EPA Registration No. 5481-480 U.S. National Stock No. 6840-01-270-9765 | Filth flies such as house flies, stable flies, and adult mosquitoes. | For use in U.S. Air Force Aerial Spray systems. Apply as ultra-low volume (ULV) with out dilution. Aircraft application: apply 30-60 ml (1/2 - 1 fl. oz.) per acre. | Naled | Concentrate causes skin and eye damage. May be fatal if swallowed or absorbed through skin. Concentrate may corrode metal spray or mixing equipment. | AMVAC Los Angeles, CA<br><br>(Note: Supplier may vary according to contract procurement awards.) |
| | | | | | |
| 23. Naled solution concentrate, (78.0%); (Trumpet EC); 113.6 litre (30 gal) drum; U.S. EPA Registration No. 59639-90-5481 U.S. National Stock No. 6840-01-532-5414 | Filth flies such as house flies, stable flies, and adult mosquitoes. | Aircraft application: Apply at the rate of 0.6 to 1.2 oz undiluted of diluted material per acre for smaller insects such as gnats and midges. Apply at the rate of 1 to 4 oz of undiluted material per acre for larger flies such as house flies.<br><br>Ground Application: ULV Sprayer must be constructed out of corrosion-resistant materials. | Naled | Concentrate causes skin and eye damage. May be fatal if swallowed or absorbed through skin. Concentrate may corrode metal spray or mixing equipment. | AMVAC Los Angeles, CA<br><br>(Note: Supplier may vary according to contract procurement awards.) |

17. **United States (USA)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
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| 24. Nithiazine (1.0%) Quick Strike Fly Abatement Strip) 24 hanging strips/box; U.S. EPA Registration No. 2724-461 U.S. National Stock No. 6840-01-467-0994 | Filth flies such as house flies. | Ready to Use as directed on label. Primarily for Outdoor use. May be used in stables, outdoor restroom facilities, and barns. Place in areas protected from moisture and direct sunlight if possible. | Nithiazine | Avoid contact with eyes. | Wellmark International (Zoecon) Schaumburg, IL<br><br>(Note: Supplier may vary according to contract procurement awards.) |
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17. **United States (USA)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
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| | | | | | |
| 25. Poly (100%) (Agnique MMF Mosquito Larvicide & Pupicide) (2 each 2.5 gal containers) U.S. EPA Registration No. 53263-28 U.S. National Stock No. 6840-01-467-1029 | Apply as formulated for larval and pupal stage mosquito control. | Apply 0.2-1.0 gal/acre to fresh and brackish water. Apply 0.35-1.0 gal/acre to polluted water. If the treated water surface is covered by the treatment film, control should be achieved.<br><br>Pupicidal control occurs within 24 hrs and larval control within 96 hrs. Film typically persists 5 to 22 days. | Poly Monomolecular Surface Film | Avoid contact with skin, eyes and clothing. | Cognis Corporation Cincinnati, OH<br><br>(Note: Supplier may vary according to contract procurement awards.) |
| | | | | | |
| 26. d-trans Allethrin aerosol, (Wasp Freeze) 14 oz can; 12 cans/box; U.S. EPA Registration No. 499-362 U.S. National Stock No. 6840-00-459-2443 | Wasps, hornets, yellow jackets, bees, and spiders. | Apply as formulated. Stand 6 to 12 feet from the nest (not directly underneath) and aim spray toward the opening of the nest. | d-trans Allethrin | Harmful if swallowed. Avoid inhalation of vapours. Avoid contact with skin and eyes. | Whitmire Research Laboratories St. Louis, MO<br><br>(Note: Supplier may vary according to contract procurement awards.) |

17. **United States (USA)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| | | | | | |
| 27. Pyrethrins (3%) and Piperonyl Butoxide (6%) w/synergists; (ULD BP-300/ Pyronyl Oil Conc./ Pyrethrins Fogging Concentrate); 3.78 liter (1 gal) can; U.S. EPA Registration Nos. 499-450/655-501/ 6218-56 U.S. National Stock No. 6840-01-104-0780 | Stored products pests, flying insects and crawling insects indoors. | For use indoors and outdoors. Space or area sprays may be applied with handheld, cart-mounted or truck mounted foggers. Use as an undiluted space spray to control stored products pests; use as a diluted spray to control flying insects; use an undiluted space spray and contact spray to kill crawling insects. | Pyrethrins, Piperonyl Butoxide - technical and MKG 264 insecticide synergist. | Harmful if swallowed. Do not apply directly to food. Cover food and food preparation surfaces prior to application. Toxic to fish. | ULD BP 300 -Whitmire Micro-Gen Research Laboratories, Inc.,St Louis, MO/ /Pyronyl Oil Concentrate - Prentiss Inc, Floral Park, FL/ Pyrethrins Fogging Concentrate – Summit Chemical Company, Baltimore, MD (Note: Supplier may vary according to contract procurement awards.) |
| | | | | | |

17. **United States (USA)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| | | | | | |
| 28. Resmethrin (4.14%) and Piperonyl Butoxide (12.42%);(Scourge); 18.9 liter (5 gal can); U.S.EPA Registration No. 432-716 U.S.-National Stock No. 6840-01-359-8533 | Adult mosquitoes, midges (biting and non-biting) and black flies | For outdoor use only. Use in hand held, portable backpack, ground or aerial ULV equipment. May be applied undiluted or diluted with refined soybean oil, light mineral oil of 54 second viscosity or other suitable solvent or diluent. Do not dilute in water. | Resmethrin and Piperonyl Butoxide - technical and related compounds) | Harmful if swallowed. Avoid breathing vapour or spray mist. Avoid contact with skin, eyes or clothing. Toxic to fish and birds. Do not apply to lakes or streams. Do not contaminate water, food, or feed. | Bayer AG Montvale, NJ<br><br>(Note: Supplier may vary according to contract procurement awards.) |
| | | | | | |
| 29. Sumithrin (10.0%) and Piperonyl Butoxide (10.0%); (Anvil 10 + 10); 18.9 liter (2 each 2.5 gal containers); U.S.EPA Reg.-No. 1021-1688-8329 U.S.-National Stock No. 6840-01-474-7751 | Adult mosquitoes | For outdoor use only. Use in hand held, portable backpack, ground or aerial ULV equipment. May be applied undiluted or diluted with refined soybean oil, light mineral oil. Do not dilute in water. | Sumithrin and Piperonyl Butoxide - technical | Harmful if swallowed. Avoid breathing vapour or spray mist. Avoid contact with skin, eyes or clothing. Toxic to fish and birds. Do not apply to lakes or streams. Do not contaminate water, food, or feed. | Clarke Mosquito Control Products Inc, Roselle, IL<br><br>(Note: Supplier may vary according to contract procurement awards.) |

| | | | | | |
|---|---|---|---|---|---|
| 30. Sumithrin (10.0%) and Piperonyl Butoxide (10.0%); (Anvil 10 + 10); 18.9 liter (250 gal mini bulk container); U.S.EPA Registration No. 1021-1688-8329 U.S.-National Stock No. 6840-01-474-7706 | Adult mosquitoes | For outdoor use only. Use in hand held, portable backpack, ground or aerial ULV equipment. May be applied undiluted or diluted with refined soybean oil. Do not dilute in water. | Sumithrin and Piperonyl Butoxide - technical | Harmful if swallowed. Avoid breathing vapour or spray mist. Avoid contact with skin, eyes or clothing. Toxic to fish and birds. Do not apply to lakes or streams. Do not contaminate water, food, or feed. | Clarke Mosquito Control Products Inc, Roselle, IL<br><br>(Note: Supplier may vary according to contract procurement awards.) |
| | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 31. Temephos (44.6%); (Abate 4E); 18.9 liter (5gal can); U.S. EPA Registration No. 8329-60 U.S. National Stock No. 6840-01-424-3132 | Mosquito and midge larvae | Mix with water. Use hand pressurized or power operated sprayers. Apply between 0.5 fl. oz. (clean water) and 1.5 fl. oz. (water with high organic content) per acre of standing water, moist areas, woodland pools, shallow ponds, around perimeter of lakes, swamps, marshes, tidal marshes, tidal waters, and catch basins. Apply as a uniform spray in sufficient water for good coverage. | Temephos | Cholinesterase inhibitor. Toxic to bees, birds and fish. Harmful if swallowed or absorbed through skin. | Clarke Mosquito Control Products Inc, Roselle, IL<br><br>(Note: Supplier may vary according to contract procurement awards.) |

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**ANNEX B**

# ALPHABETIC LIST OF CONTRIBUTING NATO MEMBERS INCLUDING INFORMATION ON AGENT, SPECTRUM OF ACTION, MODE OF APPLICATION, EFFECTIVE COMPOUNDS, PRECAUTIONS AND SOURCE OF SUPPLY OF THE RODENTICIDE

General observations on the use of rodenticides.

1. At the present time mainly anticoagulants are used for rodent control. These are derivatives of coumarin, which slow down after uptake of sufficient quantities for several days the coagulation of blood so seriously, that animals will perish by inner haemorrhage. These substances act on domestic animals and man in the same manner. Although bigger animals and man can hardly take up fatal doses, children, small animals, also dogs and cats, are endangered. Therefore, derivatives of coumarin must be applied so that children and domestic animals cannot come in contact with the poison.

2. Care must be taken to ensure the agent does not contaminate foodstuff or kitchen utensils.

3. Beyond that, the user must observe no further precautions. Maximum caution is indispensable when using strong poisons for rodent control as Zincphosphide, Talliumsulphate, Arsentrioxide and others. In any case, the instructions of the manufacturer must be followed exactly.

## B.1. BELGIUM (BEL)

General Rules

a. Gloves must be worn

b. Wash yourself after working with such chemicals

## 1. Belgium (BEL)

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| | | | | | |
| 1. Rodan Overdose | Rats and mice | Ready to use rodenticide for use in dry areas. | Difenacoum 0,005% | Avoid contact with foodstuff. Powder or bait must be applied, so that children and domestics animals (dogs, cats) have no access. | Billeni |
| | | | | | |
| 2. Tarotron | Rats | Ready to use waxbound block for use in wet areas. | Difenacoum 0,005% | Avoid contact with foodstuff. Powder or bait must be applied, so that children and domestics animals (dogs, cats) have no access. | Billeni |
| | | | | | |
| 3. Sorkil Bloc | Rats and mice | Ready to use waxbound block for use in wet areas. | Difenacoum 0,005% | Avoid contact with foodstuff. Powder or bait must be applied, so that children and domestics animals (dogs, cats) have no access. | Edialux |
| | | | | | |

## B.2. Canada (CAN)

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| | | | | | |
| **1. Brodifacoum (0.005%) (Final All-Weather Blox). 4.1 kg. CAN registration number 25423** | **Rats and mice.** | **Apply as formulated. For indoor use only. Bait MUST be placed in tamper-resistant bait station. Place along walls, near to burrows, in corners or other concealed areas. Remove as much food as is possible from treatment area. Spacing varies depending on situation, but (for rats) is recommended to be 4.5-9 m. Maintain an uninterrupted supply of fresh bait for at least 10 days or until signs of rodent activity cease.** | **Brodifacoum.** | **May be fatal if swallowed or absorbed through skin. Chemical resistant gloves, long sleeves, long pants and shoes and socks must be worn when handling product. Chemical resistant gloves must be worn when disposing of dead rodents. Avoid contact with eyes, skin or clothing. Wash hands thoroughly with soap and water after handling. Keep away from feed and feedstuffs.** | **Bell Laboratories Inc., Madison, Wisconsin, USA.** |

## B.3. CZECH REPUBLIC (CZE)

No contribution submitted.

## B.4. DENMARK (DNK)

The Danish army has no more in stock any insecticides or rodenticides. Instead we depend, when necessary, on civilian professional companies, which are authorized by governmental authorities to perform insect- and rodent control. All chemicals used by these firms are listed in the "Register of Approved Pesticides" (ISBN: 87-503-7010-3), which is revised every year.

## B.5. France (FRA)

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| | | | | | |
| 1. CAID<br>No. NMA:<br>697 910-205 | Rats | Bait ready for use. Place the bait near normal runs and feeding areas. | Chlorophacione<br>0,005 % | Keep domestic animals away. Avoid contact with foodstuff. Anticoagulant Antitoxin: Vitamin K 1 | STLLIPHA<br>115 Avenue<br>Lacarsagne<br>69 Lyon |

## 6. GERMANY (DEU)

**Precautions - Use of Rodenticides**

As a general principle, rodenticides are only to be applied with appropriate measures according to the principle of Integrated Pest Management. Aims to reduce the amount of biocides in order to minimize the exposure to humans, animals and environment. During epidemics of rodent-borne diseases, specifically licensed products are to be used.

a. Only officially approved rodenticides are to be used.

b. All rodenticides approved specifically for MOD use will, wherever practicable, carry the statutory approval of the Umweltbundesamt and/or the Biologische Bundesanstalt für Land- und Forstwirtschaft.

c. Rodenticides may only be applied by personnel who have received appropriate education, examination and training.

d. Proper accounts of rodenticide storage, issue, use and disposal are to be kept.

e. Personnel are not allowed to eat, drink or smoke when using rodenticides.

f. Foodstuff and food preparation surfaces are to be protected from rodenticides.

g. Only anticoagulant rodenticides are to be used. The use of acute poisons is prohibited.

h. Rodenticides are to be placed deliberately in order to prevent their accidental ingestion by personnel and non-target species, preferably by the use of purpose-designed, appropriately marked bait stations.

6. **Germany (DEU)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| 1. Contrax-top Concentrate | Rats and mice | Mix liquid concentrate and cereals 1+49 to form a ready - to - use bait. | 0,25% Bromadiolon | Avoid contact with foodstuff. Concentrate or bait must be applicated so that children and domestic animals (dogs, cats) have no access. | Frowein GmbH u. Co. KG 72437 Albstadt-Ebingen |
| | | | | | |
| 2. Contrax-fit BLOC 220 g block | Rats | Ready - to - use wax-bound block for use in wet areas. | 0,006% Warfarin or 0,005% Bromadiolon | Avoid contact with foodstuff. Powder or bait must be applicated so that children and domestic animals (dogs, cats) have no access. | Frowein GmbH u. Co. KG 72437 Albstadt-Ebingen |
| | | | | | |
| 3. Contrax-D Bloc 60 g block | Rats and mice | Ready - to - use wax-bound block for use in wet areas, formulated to deliver a lethal dose, used when resistances against first generation coumarins occur. | 0,0025% Difethialon | Avoid contact with foodstuff; Powder or bait must be applicated so that children and domestic animals (dogs, cats) have no access | Frowein GmbH u. Co. KG 72437 Albstadt-Ebingen |
| 4. Difenacoum Fertigköder 100 g Packs | Rats and mice | Ready - to - use rodenticide (granular bait) packed in sealed sachets that have to be placed unopened (for rats) or opened (for mice) near normal runs and feeding areas. | 0,006% Difenacuom 0,02% Sulfonamides | Avoid contact with foodstuff. Powder or bait must be applicated so that children and domestic animals (dogs, cats) have no access. | Bertram GmbH 66903 Dittweiler |
| | | | | | |

6. **Germany (DEU)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| 5. Lepit-Forst-Pellet 10 Kg bag | Commensal and field mice | Ready - to - use bait (granular) against field mice for application with bait boxes or without (15 Kg/ha) | 0,0075% Chlorphacinon | Avoid contact with foodstuff; Powder or bait must be applicated so that children and domestic animals (dogs, cats) have no access | AgrEvo Postfach 111149 40511 Düsseldorf |

## 7. Greece (GRC)

7. **Greece (GRC)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| | | | | | |
| 1. Akan | Rats-Mice | Bait | Warfarin 0,05 % | POISON | Ch. Kostabassis<br>14 Eunardou St.<br>Athens |
| | | | | | |
| 2. Vacor | Rats-Mice | Bait | N-3-Pyridylmethyl | POISON | Rohm and Haas<br>32 Xenias St.<br>Athens |
| | | | | | |
| 3. Deathmore | Rats-Mice | Bait | Warfarin 0,05 % | POISON | Ellagret OE<br>Aristotelous 38<br>Athens |
| | | | | | |
| 4. Gibbons Pelleted Rat Bait | Rats-Mice | Bait | Diphacine 0,005 % | POISON | B. Fabrakos<br>3. Sapfous St. and Menandrou, Athens |
| | | | | | |
| 5. Lion Brand Rat Killer | Rats-Mice | Bait | Coumarin 0,05 % Base | GLOVES | Gefex EPE<br>10 Pireus St., Athens |
| | | | | | |
| 6. Parasitox | Rats-Mice | Bait | Coumarine 0,05 % Base | GLOVES | SP. Margaritis<br>55 AG. Zonis, Athens |
| | | | | | |
| 7. Ratero | Rats-Mice | Bait | Warfarin 0,025 % | POISON | Abbbott Laboratories<br>194 Syngrou Ave,<br>Athens |
| | | | | | |
| 8. Racumin | Rats-Mice | Bait | Coumarin 0,375 % | GLOVES | Bayer-Epifa |

7. **Greece (GRC)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| | | | Base | | 55-59 Deligeorgi St. Athens |
| | | | | | |
| 9. Ratoxol | Rats-Mice | Bait | Warfarin 0,05 % | POISON | Chemi Prod. Hellas 42 Themistokleous St. Athens |
| | | | | | |
| 10. SOS | Rats-Mice | Bait | Zinc Phosphide 10 % | STRONG POISON | K. Papadopoulos Mich. Karaoli 21 Thessaloniki |
| | | | | | |
| 11. Ramik | Rats-Mice | Bait | Diphacinone 0,005 % | POISON | Agraria OE 122 Alexandra AVe Athens |
| | | | | | |
| 12. Rex | Rats-Mice | Bait | Zinc Phosphide 10 % | STRONG POISON | Nik. Krialis 124 Aegaleo St. Piraeus |
| | | | | | |
| 13. Tomorin | Rats-Mice | Powder | Derivative of Coumarin 1 % | GLOVES | Biofarm AE 111 Avlonas St. Athens |
| | | | | | |
| 14. Quick | Rats-Mice | Bait | Chlorophacinone 0,005 % | POISON | Sege EPE 7 Leuktron St. Peristeri-Athens |

## 8. HUNGARY (HUN)

No contribution submitted.

## 9. Italy (ITA)

9. **Italy (ITA)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| | | | | | |
| 1. Topirat-Esca | Rats and mice | Fresh baits in small paper envelopes to be spread in places infested by rodents. | Cumatetralyl | Toxic for man and domestic animals. The baits must be managed with gloves because man's smell on the baits will scare away rodents. | Sici - Via Torino n. 41 - Roma |
| | | | | | |
| 2. Sovi Tox | All rodents | Spread in small amounts in infested places. | Wheat gr. 99.8 Colorants, eccipients and odoreus substances gr. 0.175; 3 (phenyl, acetyl, ethyk) 4 hydroxicumarin gr. 0.025 | The baits must be managed with gloves because man's smell will scare away the rodents. | Bianchede - Via dei Celli Portuensi n. 139 - Roma |
| | | | | | |
| 3. Zetarat | Rats and mice | Spread the baits at one meter intervals in infested places. | Warfarin 0.0275 %; Other substances (cheese, biscuit powder, etc.) up to 100 % | Toxic for man and animals if ingested. In such cases cause vomiting and call for a physician. | Zuccet - Via Pian Due Torri n. 54- Roma |
| | | | | | |
| 4. Dicusat | Rats and mice | Prepare the baits with ham, cheese or other substances. Put the baits in places infested, by rodents. | Cumarin sulphate 50 % | Not toxic for man or for domestic animals. | Chimiberg - Via Tonale n. 15 Albano S - Alessandro-Bergamo |

9. **Italy (ITA)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| 5. Tomorin (Powder) | Rats | Put the baits along paths used by the rodents. | Cumarin 1 % and other non active and adhesive substances. | Do not contaminate food. Toxic for man and domestic animals. | Ciba-Geigy - Via Piranesi n. 44 Milano |
| | | | | | |
| 6. Ratin 2 | Rats and mice | (1) | Salmonella endotoxins. | Not dangerous for man or domestic animals. | Libce Srl - Via Zurige n. 3 Milano |
| | | | | | |
| 7. Ratinin (for agriculture) | Rats and mice | (1) | Stabilized glycosyde of Urginea Marittima Bak. | Toxic if inhaled, absorbed or ingested. | " |
| | | | | | |
| 8. CB (for agriculture) | Rats and mice | (1) | Warfarin, natural flavours and sodium hydrate. | Toxic if inhaled, absorbed or ingested. | " |
| | | | | | |
| 9. Antimurina am (for agriculture) | Rats and mice | (1) | Warfarin, meat extract, peptone, glucose, sodium phosophate, yeast extract and sodium hydrate. | Toxic if inhaled, absorbed or ingested. | " |

NOTE 1: These products are applied directly by trained personnel coming from the manufacturing firm.

## 10. Netherlands (NLD)

10. **Netherlands (NLD)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| | | | | | |
| 1. TOMCAT Blocks | Rats and mice | Ready to use bait | Brodifacoum | Use special bait boxes | Bell Lab,<br>Inc. MADISON WI<br>53704 USA |
| | | | | | |
| 2. SORKIL Blocks | Rats and mice | Ready to use bait | Difenacoum | Use special bait boxes | Edialux Ned BV<br>Veemweg 2<br>2771 MT BARNEVELD<br>The Netherlands |
| | | | | | |
| 3. STORM Blocks | Rats and mice | Ready to use bait | Fluocoumafen | Use special bait boxes | Wesemael BV<br>Zoutestraat 109<br>4561 TB HULST<br>The Netherlands |

## 11. Norway (NOR)

11. **Norway (NOR)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| 1. Warfarin | Rats and mice | Mixed with baits | Warfarin 0,025 % | Applicated so that domestic animals have no access. | Kämo-Swed, Sweden. |
| | | | | | |
| 2. Temus | Rats and mice | Mixed with baits<br>Ready for use. | Bromadiolon 0,005 % | Applicated so that domestic animals have no access. | Agro-Kemi Copenhagen, Denmark |

## 12. Portugal (PRT)

12. **Portugal (PRT)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| 1. Triple XXX | Rats and mice | Bait ready for use | Warfarin 0,025 %<br>Quinoxaline<br>Sulfate 0,025 % | – Anticoagulant<br>– Avoid inhalation of the powder<br>– Avoid contact with food-stuffs the bait must be applicated so that domestic animals (dogs, cats) have no access<br>– Antidot Vitamine K1 | Cartified<br>Av. Conselheiro<br>Fernando de Sousa<br>No. 19-10° Esq.<br>Lisboa |
| | | | | | |
| 2. Racumin | Rats and mice | a) Applicate dust directly in to rodent burrows<br>b) Mix powder and cereals 1+19 to form a ready -to- use bait | Cumatetralyl | Avoid contact with foodstuff; keep away domestic animals | Farbenfabrik Bayer<br>Leverkusen, FRG |

## 13. POLAND (POL)

No contribution submitted.

## 14. Spain (ESP)

14. **Spain (ESP)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| 1. Granulates raticide Lanirat | Against rats and mice | Bait ready to use in bags | Bromadiolon 0,005% | Avoid contact with foodstuff, bags/bait must be applicated so that children and domestic animals have no access. | Ciba-Geigy S.A. |
| | | | | | |
| 2. Granulated raticide Ratsul-D | Agasinst rats and mice | Bait ready to use for disposal into loopholes and on runways | Diphenacoum 0,005% | Avoid contact with foodstuff, recommended for use in waterresistant bait boxes; avoid contact with skin. | Zelnova, S.A. |
| | | | | | |
| 3. Soluble Powder Raticide Ratsul N.O.C.: 6840-33-0004587 | Against rats and mice | Powder to be solved in water as rodenticidal drinking stations (500 $cm^3$/ station against mice). | Warfarin 0,54% | Avoid contact with foodstuff, use drinking stations only indoors and placed so that they are out of reach of children and domestic animals, avoids skin contact with concentrate. | Zelnova, S.A. |
| | | | | | |
| 4. Blocks raticide Racumin | Against rats | Bait ready for use; qualified to be used in wet rooms and in sewages. | Cumatetralyl | Avoid contact with foodstuff; bait must be placed so that children and domestic animals have no access | Bayer, S.A.<br>Reg. D.G.S.P.<br>No. 92-10-00465<br>No. 92-10-00465 HA |
| | | | | | |

14. **Spain (ESP)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| 5. Blocks raticide Latigo | Against rats and mice | Bait ready for use recommended for use in wet areas, especially in urban sewage systems. | Bromadiolon 0,005% | Avoid contact with foodstuff; bait must be placed so that children and domestic animals have no access | Comercial Quimica Masso, S.A. Reg. Plaguicides D.S. No. 94-10-00833 |
| | | | | | |
| 6. Granulated raticide Racumin D | Against domestic and wildlife mice | Bait ready for use; applicate piles of 20-30 gr. in bait boxes every 2 to 3 m. | Cholecalciferol 0,1% (Vitamin $D_3$) | Avoid contact with foodstuff; bait must be placed so that children, domestic and nontarget animals have no access | Bayer, S.A. Reg. D.G.S. No. 1348 RAT |
| | | | | | |

## 15. TURKEY (TUR)

General issues to be considered when using rodenticides are as follows:

a. Rodenticides must be applied by wearing gloves.

b. Hands must be washed after application.

c. Domestic animals must be prevented from eating the dead mice and rats.

d. In order to prevent the spreading of disease, mice and rats must be collected and buried in a deep pit or burnt.

15. **Turkey (TUR)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| 1. Famorin | Mice | Nests, touring and feeding places of mice | Coumachlor 1% | General | Hektas Ticaret |
| | | | | | |
| 2. Racumin | Mice | Marked part of the plastic bag is cut and folded aside | Coumatetralyl 0,0375% | General | Bayer |
| | | | | | |
| 3. Callanusip | Mice, rats | Applied on hard material such has wood and fiverboard and food is placed in the center | Tibtrop | Residues are cleaned by gasoline | Bayer |
| | | | | | |
| 4. Brofar (pelet) | Mice | Nests, touring, and feeding places of mice | Brodifacoum | General | Firma Kimya |
| | | | | | |
| 5. Musal | Mice | Nests, touring, and feeding places of mice | Bromadiolone 0,005% | General | Agr Evo |

## 16. United Kingdom (GBR)

**Use of Rodenticides**

1. Policy. UK military policy on the use of rodenticides is contained in the following Joint Service Publications (JSP):

   a. JSP 371. Joint Service Manual on Pest Control

   b. JSP 375. MOD Health and Safety Handbook.

   c. JSP 424. Guidance Notes for MOD COSHH Assessors.

   d. JSP 418. MOD Environmental Manual

2. Summary of General Safety Precautions. As a general principle, rodenticides are only to be employed where other, less invasive techniques of control (such as environmental measures) are not considered to be effective.

   a. Only officially approved rodenticides are to be used.

   b. All rodenticides approved specifically for MOD use will, wherever practicable, carry the statutory approval of the Health and Safety Executive/Ministry of Agriculture, Fisheries and Food.

   c. The local purchase of rodenticides is prohibited.

   d. Rodenticides may only be applied by personnel who have received appropriate training. The minimum acceptable level for non-specialist personnel is successful attendance on the Unit Environmental Health Duties Course.

   e. There is to be proper accounts kept of rodenticide storage, issue, use and disposal.

   f. Rodenticides are to be stored in a secure, hazard-marked store, and kept in their original packaging. Hazard/risk assessments and manufacturers safety data sheets are to be readily available.

   g. Personnel are not to eat, drink or smoke when using rodenticides.

   h. Foodstuff, and food preparation surfaces, are to be protected from rodenticides.

   i. Only anticoagulant rodenticides are to be used. The use of acute poisons is prohibited.

   j. Rodenticides are to be placed to prevent their accidental ingestion by personnel and non-target species, preferably by the use of purpose-designed, appropriatly marked bait stations.

16 **United Kingdom (GBR)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| | | | | | |
| 1. Neosorexa Hl/6840-99-978-3210 | Rats and mice | Ready-to-use. rodenticide (granular bait). Baiting points should be sited near normal runs and feeding areas | 0,005 % Difenacoum | For indoor and outdoor use | Sorex Ltd., . |
| | | | | | |
| 2. Brodifacoum blocks Hl/6840-99-978-3211 | Rats and mice | Ready-to-use Wax-bound rodenticide blocks, formulated to deliver a lethal dose | 0,002 % Brodifacoum | Not approved for use outdoors. | Sorex Ltd., . |
| | | | | | |
| 3. Neosorexa Throw Packs H1/6840-99-978-3212. | Rats and mice | Ready-to-use rodenticide (granular bait) packed in sealed polymer sachets. Sachets placed unopened (for rats) or opened (for mice) near normal runs and feeding aereas | 0,005 % Difenacoum | For indoor and outdoor use. | Sorex Ltd., . |

## 17. United States (USA)

17. **United States (USA)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| 1. Diphacinone Anticoagulant (0.005%); (Ramik bars; 226.0 grams (8oz) block; 40 Bars/box or Ditrac Super-size Blox - 20 each 1-lb blocks/box<br>U.S. EPA Registration Nos. 61282-12/12455-14<br>U.S. National Stock No. 6840-00-089-4664 | Norway Rats, Roof Rats and House mice | Apply as formulated. Place baits where rats and/or mice will find and consume bait. Place baits in locations not accessible to children, domestic animals, and wildlife or in tamper proof bait boxes. | Diphacinone | Precautions should be taken to make sure that the blocks are not consumed or a contaminate foodstuff. Dispose of dead rats and mice promptly to protect domestic cats and dogs as well as other wildlife. | Ramik Bars – HACCO, Inc, Madison, WI<br><br>Ditrac Super-size Blox -Bell Laboratories, Inc. Madison, Wisconsin<br><br>(Note: Supplier may vary according to contract procurement awards.) |
| | | | | | |

17. **United States (USA)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| 2. Anticoagulant ready to use pellets (Bromadiolone 0.005%); (Maki); 11 lb can; U.S. EPA Registration No. 7173-188 U.S. National Stock No. 6840-01-151-4884 | Norway rats, roof rats and house mice. | Use as formulated. Baits should be placed in tamper-proof bait boxes. Place tamper-proof bait boxes containing bait where rats and/or mice will find and consume. An uninterrupted supply of bait should be maintained for a minimum of 12 days. | Bromadiolone | May be harmful if swallowed. Do not contaminate water, food or feed. Avoid ingestion by humans, domestic animals or wildlife. Dispose of dead rats and mice promptly to protect domestic cats and dogs as well as other wildlife. | LiphaTech, Inc. Milwaukee, Wisconsin<br><br>(Note: Supplier may vary according to contract procurement awards.) |
| | | | | | |

17. **United States (USA)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| 3. Anticoagulant ready to use pellets (Brodifacoum 0.005%); (Talon G); 5 lb can; U.S. EPA Registration No. 100-1057 U.S. National Stock No. 6840-01-508-6085 | Norway rats and house mice. | Use as formulated. Baits should be placed in tamper-proof bait boxes. Place tamper-proof bait boxes containing bait where rats and/or mice will find and consume bait. Generally, place bait blocks along walls, by gnawed openings in and around burrows, in corners and along walls or other places where rats and mice have been observed. An uninterrupted supply of bait should be maintained for a minimum of 12 days. | Brodifacoum | May be harmful if swallowed. Do not contaminate water, food or feed. Avoid ingestion by humans, domestic animals or wildlife. Dispose of dead rats and mice promptly to protect domestic cats and dogs as well as other wildlife. | Syngenta Crop Protection, Inc Greensboro, NC<br><br>(Note: Supplier may vary according to contract procurement awards.) |

17. **United States (USA)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| 4. Anticoagulant concentrate (0.106% diphacinone); (LIQUA TOX II); 50/1.7 oz pouches per box; U.S. EPA Registration No. 12455-61 U.S. National Stock No. 6840-00-753-4972 | Field mice, field rats, Norway and roof rats. | Use as formulated. Baits should be placed in tamper-proof bait boxes. Place tamper-proof bait boxes containing bait where rats and/or mice will find and consume bait. Generally, place bait blocks along walls, by gnawed openings in and around burrows, in corners and along walls or other places where rats and mice have been observed. An uninterrupted supply of bait should be maintained for a minimum of 12 days. | Sodium salt of Diphacinone | May be harmful or fatal if swallowed. Do not contaminate water, food or feed. Avoid ingestion by humans, domestic animals or wildlife. Dispose of dead rats and mice promptly to protect domestic cats and dogs as well as other wildlife. | Bell Laboratories, Inc. Madison, WI<br><br>(Note: Supplier may vary according to contract procurement awards.) |
| | | | | | |

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# ANNEX C

# ALPHABETIC LIST OF CONTRIBUTING NATO MEMBERS INCLUDING INFORMATION ON AGENT, SPECTRUM OF ACTION, MODE OF APPLICATION, EFFECTIVE COMPOUNDS, PRECAUTIONS AND SOURCE OF SUPPLY OF THE REPELLENTS

## General observations on the use of repellents

Attention must be paid that neither the eyes nor mucous membranes are affected by the agents. Generally the protective effect lasts about six hours.

## C.1. Belgium (BEL)

1. **Belgium (BEL)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| | | | | | |
| 1. Repello Insect repellent | Provides protection against mosquitoes and other insects | Spray | 50% N,N Diethyl-toluamide (DEET) | Avoid contact with foodstuff and drinks, including those for animals. No access for children | Repello |
| | | | | | |
| 2. Insect Ecran | Soaking tissues in a solution o provide a protection against mosquitoes for 2 months | Solution on clothing or mosquito nets | Permethrine 8 % | No direct application on the skin | Cooper |

## C.2. Canada (CAN)

2. **Canada (CAN)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| | | | | | |
| 1. Deet (31.5%; N,N Diethyl-m-touluamide) (Ultrathon). CAN registration number 22966 | Mosquitoes and black flies. | Apply as formulated to exposed skin. | Deet. | Avoid contact with eyes and mouth. Do not ingest. | 3M Canada, London, Ontario, Canada. |
| | | | | | |
| 2. Permethrin (0.5%) (Permethrin Arthropod Repellent). 177 mL. CDN registration number 27930 | Mosquitoes and ticks. | Apply as formulated. Shake before using. Application to be carried out in well ventilated area. Apply in slow sweeping motion until fabric lightly wetted. About 3/4 of a can will treat a combat uniform. Allow to dry for 2-4 hours. Treatment of mosquito netting is as for clothing. Reapply to clothing after six launderings, and netting after one month. DO NOT TEAT HEAD GEAR OR UNDERGARMENTS. | Permethrin. | Harmful if inhaled. Avoid breathing vapours or contact with face, eyes or skin. Wash hands after application. Contents under pressure: do not puncture; do not allow temperature of container to exceed 54 C. Keep away from food, mess gear and water supplies. | Coulston Products Inc., Florida, USA. |
| | | | | | |
| 3. Permethrin (40%) (Insect/Arthropod Repellent Protective Treatment for Military Combat Clothing). 9 mL. CDN registration number 28650 | Mosquitoes and ticks. | For military combat clothing only. Dilute with clean water (450 mL). Wearing chemical resistant gloves, pour water and permethrin concentrate into bag, gently agitate and then place rolled-up article of clothing (coat or trousers) into bag. Let stand for 3 hours or | Permethrin. | Fatal or poisonous if swallowed. Do not apply to skin. Potential skin sensitizer. Keep away from food, mess gear and water supplied. Wash thoroughly after handling fluid, container or wet treated uniform and before eating or smoking. Use | Coulston Products Inc., Florida, USA. |

2. **Canada (CAN)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| | | more. Remove, hang up and allow to dry. Mark clothing with date and with "permethrin treated". Clothing will maintain performance through about 50 washes for mosquitoes. Application is to take place under appropriate supervision at a military facility and in a well ventilated area. | | chemical resistant gloves when mixing. Extremely toxic to fish and other aquatic organisms. Do not contaminate water by cleaning of equipment, disposal of equipment wash waters or disposal of wastes. | |

## C.3. CZECH REPUBLIC (CZE)

No contribution submitted.

## C.4. DENMARK (DNK)

No contribution submitted.

## C.5. France (FRA)

5. **France (FRA)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| | | | | | |
| 1. Insect Ecran peau adulte (lotion) 697.200.535.002 | Biting athropods | Application of lotion directly onto exposed skin areas | 50% N,N-Diethyl-m-toluamide (DEET) | Not to be applied near the eyes and mouth. Strong plasticizer. | OSLER |

## C.6. GERMANY (DEU)

**Precautions - Use of Repellents**

a. Only officially approved repellents are to be used.

b. All repellents must carry the statutory approval of the Paul-Ehrlich-Institute, the Umweltbundesamt or the MOD.

c. Repellents are only to be used in strict compliance with the manufacturers' instructions as shown on the label.

6. **Germany (DEU)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| | | | | | |
| 1. Insekten-schutzmittel Bw, 40 ml glass flask, old formulation produced until year 2002 | Biting arthropods | Application of solution onto exposed skin areas | 30% N,N Diethyl-m-toluamide (DEET), solution | Avoid contact with eyes and mucous membranes. May corrode plastics. Do not ingest solution. | Bw Pharmacy Koblenz Stock of the German Bundeswehr Stock-number 6840-12-192-5468 |
| | | | | | |
| 2. Insektenschutz-mittel Bw, 75 ml plastic flask, new formulation, produced since year 2002 | Biting arthropods | Application of solution onto exposed skin areas | 30% N,N Diethyl-m-toluamide (DEET), ointment, extended duration formulation | Avoid contact with eyes and mucous membranes. May corrode plastics. Do not ingest ointment | Bw Pharmacy Koblenz Stock of the German Bundeswehr Stock-number 6840-12-354-2927 |
| | | | | | |
| 3. Peripel 1 l can; HSE Reg.No: 5659 | Mosquitoes and other biting arthropod vectors | Impregnation of bednets and clothing | 10% Permethrin (20:80=cis:trans) | Only to be applied under appropriate supervision. Clothing must not be worn until dried. | AgrEvo Environmental Health Ltd.; UK National Stock-No: H1/6840-01-284-3982 |
| | | | | | |

6. **Germany (DEU)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| 4. Repellent, Clothing application, 6-oz spray can; US EPA Reg.No: 50404-5 | Mosquitoes, ticks, mites, and other biting arthropods | Apply as fromulated. For treating military field clothing and mosquito netting only. Hold can 15 to 20 cm from surface to be treated. Do not treat uniform cap or undergarments. | 0,5% Permethrin (cis:trans=40%:60%) | Make applications outdoors. Do not use or store near heat or open flame. Use protective gloves when mixing or handling freshly treated, wet uniforms or mosquito netting. Avoid contact with face, eyes, or skin. Avoid breathing vapors or spray mist. Wash hands thoroughly after handling. | Colston International Corp., Easton, Pensylvania, USA, US National Stock No: 6840-01-278-1336 |

## C.7. Greece (GRC)

7. **Greece (GRC)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| 1. Autan | Biting arthropods | Solution | Diethyl-Toluamide 33 % (DEET) | Avoid contact with eyes etc. | Bayer Apifa AE 55-59 Deligeorgie St. Athens |
| | | | | | |
| 2. Autan | Biting arthropods | Spray | Diethyl-Toluamide 13,2 % (DEET) | Avoid contact with eyes etc. | Bayer Apifa AE 55-59 Deligeorgie St. Athens |
| | | | | | |
| 3. Autan | Biting arthropods | Stick | Diethyl-Toluamide 33 % (DEET) | Avoid contact with eyes etc. | Bayer Apifa AE 55-59 Deligeorgie St. Athens |
| | | | | | |
| 4. Autan | Biting arthropods | Emulsion | Diethyl-Toluamide 25 % (DEET) | Avoid contact with eyes etc. | Bayer Apifa AE 55-59 Deligeorgie St. Athens |
| | | | | | |
| 5. Off | Biting arthropods | Solution | Diethyl-Toluamide 35 % (DEET) | Avoid contact with eyes etc. | S. Johnson and Son Hella EPE Aspropyrgos-Attica |
| | | | | | |
| 6. Off | Biting arthropods | Spray | Diethyl-Toluamide 15 % (DEET) | Avoid contact with eyes etc. | S. Johnson and Son Hella EPE Aspropyrgos-Attica |
| | | | | | |
| 7. Ipiplex | Biting arthropods | Spray | Dimethyl-Phthalate 28 % (DIMP) | Avoid contact with eyes etc. | Agrochimiki EPE 24 EM. Mpenaki St. |

7. **Greece (GRC)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| | | | | | Athens |

## C.8. HUNGARY (HUN)

No contribution submitted.

## C.9. ITALY (ITA)

No contribution submitted.

## C.10. Netherlands (NLD)

10. **Netherlands (NLD)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| | | | | | |
| 1. Care plus® anti insect DEET | Blood-sucking arthropods (e.g, Mosquitoes, flies, ticks) | Apply to skin | N,N-diethly-m-toluamide (DEET), solution 50%, gel 30 % | Precautions: avoid contact to mucous membranes, do not ingest. | Tropenzorg B.V. PO box 1415, NL-1300 BK Almere |
| | | | | | |
| 2. AUTAN Mosquito | Mosquitoes, flies | Apply to skin | Diethyl-m-toluamide solution (33 %) | | BAYER DIVISIE AROCHEMIE Postbus 105 ARNHEM |
| | | | | | |
| 3. Permethrin Clothing Application, 40% permethrin concentrate, IDA Kit; 12 kits/'box; U.S.EPA Registration No. 63120-3 U.S. National Stock No. 6840-01-345-0237<br>Untill the necessary military field uniforms are factory-impregnated; NLD will use the IDA-kit to impregnate. | Mosquitoes, ticks, chiggers, and human body lice. | For military field uniform treatment only. Mix permethrin concentrate with water and apply to uniform in bags, will treat one uniform. Hang uniform for 3 hours or until dry. Mark uniform with date of treatment using the laundry marker included in the kit. Do not Re-treat uniforms; one treatment is effective for 50 launderings. Do not use to treat hats, headgear, socks or undergarments. | Permethrin, 40% concentrate | Make all applications outdoors. Use protective gloves when mixing or handling freshly treatetd, wet uniforms or mosquito netting. Avoid contact with face, eyes or skin. Avoid breathing vapours. Wash hands thoroughly after handling. Do not store below 32 degrees F. Do not reuse empty impregnations bags or other materials. | Colston International Corporation, Easton, Pennsylvania<br><br>Hilton Head Labs Ridgeland, SC<br><br>(Note: Supplier may vary according to contract procurement awards.) |

## C.11. NORWAY (NOR)

No contribution submitted.

## C.12. Portgual (PRT)

12. **Portgual (PRT)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| | | | | | |
| 1. Repelente (cream) | Mosquitoes biting flies, ticks | Applied by hand to exposed parts of the skin. | N,N-Diethyl-toluamide 20 % | Irritant to eyes and mucous membranes. Ingestion can cause CNS disturbances. | Laboratorio militar de Produtos Quimicos e Famaceuticos<br>Av. Alfredo Bensaude<br>Lisboa |

## C.13. POLAND (POL)

No contribution submitted.

## C.14. SPAIN (ESP)

No contribution submitted.

## C.15. TURKEY (TUR)

No contribution submitted.

## C.16. UNITED KINGDOM (GBR)

### Use of Repellents

1. Policy. UK military policy on the use of repellents is contained in the following Joint Service Publications (JSP):
    a. JSP 371. Joint Service Manual on Pest Control
    b. JSP 375. MOD Health and Safety Handbook.
    c. JSP 424. Guidance Notes for MOD COSHH Assessors.
    d. JSP 418. MOD Environmental Manual 1.
2. Summary of General Safety Precautions.
    a. Only officially approved repellents are to be used.
    b. All repellents approved specifically for MOD use will, wherever practicable, carry the statutory approval of the Health and Safety Exe-cutive/Ministry of Agriculture, Fisheries and Food.
    c. Repellents are only to be used in strict compliance with the manufacturers' instructions as shown on the label.

16. **United Kingdom (GBR)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| 1. Peripel HI/6840-99-300-0661 | Mosquitoes and other flying insects | Impregnation of bednets and clothing | 10% WW permethrin | General. Only to be applied under appropriate supervision. Clothing must not be worn until dried. | AgrEvo Environmental Health Ltd |
| | | | | | |
| 2. Insect repellent personal appli-cation HI/6840-01-284-3982 | Biting arthropods | Application from tube onto exposed skin areas | 32% NN Diethyl-m-toluamide (DEET) | General. Not be applied near the eyes and mouth. May corrode plastics | 3M Health care |

## C.17. United States (USA)

17. **United States (USA)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| 1. Permethrin Clothing Application (40%); liquid concentrate; for use in 2 gallon sprayer application to fabric; 151 ml bottle; 12 bottles-/box. U.S. EPA Registration No. 63120-1 U.S. National Stock No. 6840-01-334-2666 | Mosquitoes, ticks, chiggers and other biting insects. | Mix concentrate with water and apply with 2 gallon sprayer at 55 psi. Place military uniforms or mosquito nets on the ground or flat surface and spray front and back surfaces until soaking wet. Hang uniforms and bednets for 3 hours or until dry. One two gallon sprayer mix should treat an average of 8 uniforms. May be used to treat tentage. | Permethrin | Make all applications outdoors. Use a NIOSH/MSHA approved respirator with pesticide filters and protective gloves when mixing or handling freshly treated, wet uniforms or mosquito netting. Avoid contact with face, eyes, or skin. Avoid breathing vapours or spray mist. Wash hands thoroughly after handling. Do not store below 32 degrees F. | Sawyer Products Safety Harbour, FL<br><br>Hilton Head Labs Ridgeland, SC<br><br>(Note: Supplier may vary according to contract procurement awards.) |
| | | | | | |

17. **United States (USA)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| 2. Permethrin Clothing Application (0.5%); Aerosol; 6 oz can; 12 cans/box; U.S. EPA Registration No. 50404-5 U.S. National Stock No. 6840-01-278-1336 | Mosquitoes, ticks, chiggers and other biting insects | Place military uniforms, civilian field clothing, and/ or mosquito nets on the ground or flat surface. Use ¾ can and spray front and back surfaces of clothing until wet. Hang treated uniforms, civilian clothing and bednets for 2 to 4 hours or until dry. Reapply after 6 weeks or 6 launderings. Do not use to treat hats, headgear, socks or undergarments. | Permethrin | Make all applications outdoors. Do not use or store near heat or open flame. Exposure to temperatures above 130 degrees F may cause bursting. | Colston International Corporation Easton, Pennsylvania<br><br>(Note: Supplier may vary according to contract procurement awards.) |
| 3. Permethrin Clothing Application, 40% permethrin concentrate, IDA Kit; 12 kits/'box; U.S. EPA Registration No. 63120-3 U.S. National Stock No. 6840-01-345-0237 | Mosquitoes, ticks, chiggers, and human body lice. | For military field uniform treatment only. Mix permethrin concentrate with water and apply to uniform in bags, will treat one uniform. Hang uniform for 3 hours or until dry. Mark uniform with date of treatment using the laundry marker included in the kit. Do not Re-treat uniforms; one treatment is effective for 50 launderings. Do not use to treat hats, headgear, socks or undergarments. | Permethrin | Make all applications outdoors. Use protective gloves when mixing or handling freshly treated, wet uniforms or mosquito netting. Avoid contact with face, eyes, or skin. Avoid breathing vapours. Wash hands thoroughly after handling. Do not store below 32 degrees F. Do not reuse empty impregnation bags or other materials. | Colston International Corporation Easton, Pennsylvania<br><br>Hilton Head Labs Ridgeland, SC<br><br>(Note: Supplier may vary according to contract procurement awards.) |

17. **United States (USA)**

| Agent | Effective against | Mode of Application | Effective compounds | Precautions | Manufacturer |
|---|---|---|---|---|---|
| | | | | | |
| 4. DEET Personal Application (33%); 2 oz tube; 12 tubes/box; U.S. EPA Registration No. 58007-1 U.S. National Stock No. 6840-01-284-3982 | Repels Biting flies (Mosquitoes, deer flies and stable flies), chiggers, fleas, and gnats on exposed skin surfaces. | Apply as formulated. | N,N-Diethyl-m-toluamide (DEET) | Apply a thin layer to exposed skin. Avoid contact with eyes and lips. May damage certain synthetic fabrics, plastics, painted or varnished surfaces. Avoid smearing on plastic eyeglass frames, goggles, watch crystals, etc. | 3M St. Paul, Minnesota (Note: Supplier may vary according to contract procurement awards.) |
| 5. Camouflage Face Paint with DEET (30%); 1.6 fl oz per compact; 12 compacts/box; U.S. EPA Registration No. 66306-11 U.S. National Stock No. 6840-01-493-7334 | Repels Biting flies (Mosquitoes, deer flies and stable flies), ticks, chiggers, fleas, and gnats on exposed skin surfaces. | Apply as formulated. | N,N-Diethyl-m-toluamide (DEET) | Apply a thin layer to exposed skin. Avoid contact with eyes and lips. May damage certain synthetic fabrics, plastics, painted or varnished surfaces. Avoid smearing on plastic eyeglass frames, goggles, watch crystals, etc. | Iguana LLC Thomasville, GA (Note: Supplier may vary according to contract procurement awards.) |

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