

**LESSON 9:** Management of Arthropods through Non-Chemical (Sanitation) and Chemical Practices

**TYPE OF INSTRUCTION:** Lecture and field demonstration

**TRAINING TIME:** 4 Hours

**TOOLS, EQUIPMENT, AND MATERIALS:** None

**PERSONNEL:** One instructor, MOS 91S or AOC 72 series

**INSTRUCTIONAL AIDS:** Projection equipment, screen, PowerPoint presentation

**REFERENCES:** AR 40-5, Preventive Medicine; FM 21-10, Field Hygiene and Sanitation; FM 4-25.12, Unit Field Sanitation Team; FM 4-02.17, Preventive Medicine Services;

**STUDY ASSIGNMENT:** FM 4-25.12, Chapter 2

**STUDENT UNIFORM AND EQUIPMENT:** Duty uniform; Soldier's Guide and pencil/pen; FM 21-10; FM 4-25.12

**TRANSPORTATION REQUIREMENTS:** None

### **Section I. INTRODUCTION**

**Show Slide FSTCC0009-1: Title**

**OPENING STATEMENT:** In many of our lessons we have talked about the importance of good sanitation and hygiene practices and how they help control the spread of disease. You've been introduced to the arthropods that are important to the military. You are also familiar with the individual preventive medicine measures soldiers can take to protect themselves from them. Now, let's look at some of the measures that can be taken at the unit level to control arthropods and help prevent the spread of arthropod-borne illness.

**Show Slide FSTCC0009-2: Lesson Objectives (1)**

**NOTE:** Inform the students of the enabling learning objectives for this lesson.

## LESSON OBJECTIVES

After completing this lesson, you should be able to:

- 9-1. Identify non-chemical (sanitation) methods of controlling arthropods.
- 9-2. Identify properties of pesticides.
- 9-3. Identify the factors to consider when assessing the risk associated with the use of pesticides.
- 9-4. Identify safety precautions associated with the use of pesticides.

### Show Slide FSTCC0009-3: Lesson Objectives (2)

- 9-5. Describe disposal methods for pesticides and their containers.
- 9-6. Select, in order, the steps required to prepare the 2-gallon sprayer for use.
- 9-7. Select, in order, the steps required to operate the 2-gallon sprayer.
- 9-8. List the measures taken to maintain the 2-gallon sprayer.

## Section II. EXPLANATION

### Show Slide FSTCC0009-4: Sanitation Practices

#### 9-1. SANITATION PRACTICES

Many people feel on a large scale, such as the unit level, that the best way to control bugs is to hose them down with chemical pesticides. Unfortunately, this is often done without considering what caused the problem in the first place; improper sanitation practices. Consider a pile of opened garbage. You can spray and spray, but unless you eliminate this breeding ground for flies, you're still going to have a problem. Let's look, now, at some ways we can manage arthropods using good sanitation practices instead of chemicals.

a. **Eliminate arthropod habitats.** Remember when we talked about arthropods that we talked about their habitat? The safest way to control most arthropods is to eliminate their living and breeding areas. Let's see what you remember about arthropod habitats.

### **Show Slide FSTCC0009-5: Rodent Control**

b. **Control rodents in the unit area.** Because rodents are a host to a number of parasites, rodent control plays a major role in the management of arthropods. Rodent control is discussed specifically in lesson ten.

### **Show Slide FSTCC0009-6: Waste Disposal**

c. **Use proper waste disposal procedures.** Proper disposal of garbage and waste is a critical factor in the control of the filth fly and cockroach.

(1) Garbage containers should be tightly covered and the garbage should be disposed of in approved sites.

(2) Latrine facilities should be properly constructed and fly-proofed. Latrines should be policed and cleaned daily.

(3) Garbage and waste disposal devices should be filled in and properly closed out when full or abandoned.

(4) Keep kitchen and food service facilities clean and free of debris that would provide food, water, and shelter.

### **Show Slide FSTCC0009-7: Animal Nesting/Feeding Areas**

d. **Avoid animal nesting areas.** In order to control exposure to mosquitos and fleas, do not establish the area of operations near animal breeding or nesting areas such as ponds or burrows.

### **Show Slide FSTCC0009-8: Chemical Practices**

## **9-2. CHEMICAL PRACTICES**

There will more than likely be a time when even the best sanitation efforts fall short of controlling arthropods in your unit area. When this is the case, you can augment your efforts with the use of pesticides. **AUGMENT** is the operative word here; chemicals are not meant to take the place of the individual or unit-level preventive medicine measures we have discussed.

### **Show Slide FSTCC0009-9: Properties of Pesticides**

a. **Properties of pesticides.** There are several things you must consider prior to implementing a chemical control program. Knowing the properties of pesticides will help you exercise sound judgment when using these chemicals in your area of operation.

### **Show Slide FSTCC0009-10: Pesticides are Toxic**

(1) Pesticides are toxic. Pesticides are toxic, or poisonous, substances designed to kill pests such as mosquitos, ticks, and rodents. Keep in mind that, in sufficient quantities, they can also be harmful or deadly to domestic animals and humans.

### **Show Slide FSTCC0009-11: Pesticides and Solvents**

(2) Pesticides and solvents. The toxic ingredients in pesticides are often mixed with solvents such as kerosene or fuel oil. The presence of these solvents makes them more hazardous to humans.

### **Show Slide FSTCC0009-12: Pesticide Absorption**

(3) Pesticide absorption into the skin. The toxic chemicals in pesticides are often mixed with an oil-based solution. Human skin repels water but absorbs oil. Therefore, the pesticide is absorbed into the skin along with the oil. This should tell you that protective clothing is required when working with pesticides.

b. Because of their toxic properties, all pesticides should be considered potentially hazardous. You can find the hazard and risk information on the pesticide label. Always refer to the label instructions for use, protective clothing requirements, and safety precautions prior to using a pesticide. In all cases, THE LABEL IS THE LAW.

### **Show Slide FSTCC0009-13: Estimate the Hazard**

#### **9-3. ESTIMATE THE HAZARD**

Estimating the hazard potential for any pesticide is important prior to using it. There are several factors to consider when determining the hazards associated with chemical use. To determine the hazard posed by a particular chemical, ask yourself these questions.

- a. What are the toxic effects if the pesticide is accidentally inhaled or ingested?
- b. What is the concentration of the toxic substance I will be handling while mixing the pesticide? While applying it?
- c. How much pesticide needs to be applied in order to achieve the desired results?
- d. How often do I need to apply the pesticide?

e. What environmental conditions exist at the time of application? Am I indoors or outdoors? Is there proper ventilation? Is there a breeze? What temperature is best and safest for the application of this chemical?

NOTE: It is important to remember that the hazard for any pesticide is negligible, as long as you use it correctly.

**Show Slide FSTCC0009-14: Safety Precautions**

**9-4. SAFETY PRECAUTIONS**

Like all potentially hazardous substances, there are certain safety precautions that must be taken. Remember to consult the label instructions for additional safety precautions that are unique to the chemical that you plan to use.

- a. Pesticides should not be stored or used near an open flame.
- b. Do not mix pesticides. Mixing pesticides can render them ineffective or, worse, can create an even more toxic substance.

**Show Slide FSTCC0009-15: Disposal of Pesticide Containers**

**9-5. PESTICIDE DISPOSAL**

- a. Dispose of any unused pesticide properly.
  - (1) The easiest way to dispose of pesticides is to avoid having any to dispose of. In other words, use the entire mixed amount of pesticide against the arthropod you have targeted.
  - (2) When a pesticide can not be used for its intended purpose or when a pesticide is no longer authorized for use, any unused quantity should be returned to the manufacturer through the Defense Marketing and Utilization Office (DRMO).
- b. Dispose of the empty pesticide container properly. Triple-rinse the container to ensure that the container is free of chemicals prior to disposal. Then crush or puncture the container prior to disposal to render the container unusable. To triple-rinse the container:

**Show Slide FSTCC0009-16: Triple-rinse Procedure**

- (1) First, fill the pesticide container with water.
- (2) Pour the rinse water into the 2-gallon sprayer along with the water used to dilute the pesticide being applied.

- (3) Repeat steps 1 and 2 two more times.

**Show Slide FSTCC0009-17: Using the 2-gallon Sprayer**

**9-6. PREPARING THE 2-GALLON SPRAYER**

As a member of the field sanitation team, you are authorized to use the hand pressure sprayer to apply pesticides. The sprayer comes in either one or two gallon capacities. The basic procedures are the same for both. This lesson discusses the procedure for using the 2-gallon sprayer. Just remember that when you use the 1-gallon sprayer you need to reduce all quantities by one half.



**a. Sprayer components.**

**Show Slide FSTCC0009-18: Sprayer Components - Instructions**

- (1) Instruction manual. Your sprayer comes with an instructional manual that you must retain and follow for proper operation and maintenance.

**Show Slide FSTCC0009-19: Sprayer Components – Spare Parts**

- (2) Three sets of spare parts.

**Show Slide FSTCC0009-20: Sprayer Components – Pressure Gauge**

- (3) Pressure gauge. Each sprayer should come equipped with a pressure gauge. If your unit has an older model that does not have a gauge, one can be ordered and installed by following the manufacturer's instructions.

**b. Preparing to use the sprayer.**

**Show Slide FSTCC0009-21: Prepare to Spray – Step 1**

- (1) Mix the pesticide you are going to use. This is done right in the sprayer itself to help avoid contaminating the ground with spillage. Follow the label instructions to determine the amount of pesticide necessary for your situation.

**Show Slide FSTCC0009-22: Prepare to Spray – Step 2**

- (2) Select the appropriate nozzle. Choose the nozzle best suited for the type of application you desire. Attach it to the wand by screwing it on.



**Show Slide FSTCC0009-23: Solid Stream Nozzle**



(a) Use the solid stream nozzle to spray cracks and crevices. This type of nozzle is most appropriate if cockroaches are suspected.

**Show Slide FSTCC0009-24: Hollow Cone Nozzle**



(b) Use the hollow cone nozzle to treat large areas where light coverage is desired. This type of nozzle is often used against mosquito larvae by spraying the surface of the standing water.

**Show Slide FSTCC0009-25: Solid, or Full, Cone Nozzle**



(c) Use the solid cone nozzle to treat large areas where heavy coverage is desired. This type of nozzle is especially effective in weedy, heavily vegetated areas and is often used when ticks and mites are suspected.

**Show Slide FSTCC0009-26: Flat Fan Nozzle**



(d) Use the flat fan nozzle for even coverage of pesticide on a flat surface, such as a wall. You would also use this type of nozzle to spray a dumpster for fly control.

**Show Slide FSTCC0009-27: Prepare to Spray – Step 3**

(3) Pressurize the sprayer to 40 psi. Unlock the pump handle by turning it ninety degrees to the left. If this is the first time you are using the sprayer for the day, you can increase the efficiency of the pump and make it easier to operate by putting a few drops of lubricating oil on the pump rod. (Note: this is the only lubrication the sprayer requires.)



**Show Slide FSTCC0009-28: Sprayer Operation**

**9-7. OPERATING THE 2-GALLON SPRAYER**

a. **Sprayer operation.** Operate the sprayer by squeezing the operating lever on the wand and moving the wand back and forth to create an even spray.

b. It's a good idea to practice your spraying technique using water to simulate the pesticide until you are able to cover the designated surface evenly and without run-off.



c. Use all of the pesticide in the sprayer on the job, whenever possible. NEVER pour excess pesticide down the drain or onto the ground.

**Show Slide FSTCC0009-29: Sprayer Maintenance**

## **9-8. MAINTAINING THE 2-GALLON SPRAYER**

Just like any other piece of equipment, a certain amount of maintenance is required to keep the sprayer operating efficiently. Sprayer maintenance is an operator responsibility.

**Show Slide FSTCC0009-30: Sprayer Maintenance – Step 1**

a. **Rinse the sprayer after each use.** Triple-rinse the sprayer and spray the rinse water over the treated area or store it in an approved, properly labeled container for future use.

**Show Slide FSTCC0009-31: Sprayer Maintenance – Step 2**

b. **Wipe the outside of the sprayer.** After rinsing, wipe the outside of the sprayer to prevent pesticide from crystallizing. The crystals will corrode metal, jam the valves, deteriorate the gaskets and cause the nozzle to malfunction.

NOTE: Any time the sprayer fails to function properly, thoroughly clean the tank and the strainers in water. Remove the nozzle strainer and the in-line strainer from the wand handle.

**Show Slide FSTCC0009-32: Sprayer Maintenance – Step 3**

c. **Replace worn parts.** Parts that may need replacement include the hose, the leather piston cup and the pump cylinder valve.

**Show Slide FSTCC0009-33: Demonstration – Maintenance Procedures**

DEMONSTRATION: Demonstrate for the students the proper procedures for replacing the hose, the leather piston cup and the pump cylinder valve. Refer to the manufacturer's instruction manual that comes with the sprayer for the steps involved in replacing these parts.

## **Section III. SUMMARY**

**Show Slide FSTCC0009-34: Summary**

NOTE: Review the main points with the audience. Ask and answer questions to ensure understanding of the material presented in this lesson.



**CLOSING STATEMENT:** I hope you have seen that relatively simple but consistent sanitation practices can go a long way toward keeping arthropods at an acceptable level in your unit area. If necessary, these measures may be augmented with the use of pesticides, but remember that these are toxic chemicals and must be used in accordance with the label instructions. When used to apply pesticides, the 2-gallon sprayer can be a valuable tool. As a member of the Field Sanitation Team you are authorized to operate the 2-gallon sprayer. However, don't forget the importance of maintenance – it is an operator responsibility. Finally, always remember to read and follow ALL label instructions. When conflicting data is encountered remember, THE LABEL IS THE LAW.