

# PLANNING THE PESTICIDE APPLICATION

### LEARNING OBJECTIVES

After studying this chapter, you should be able to:

- Explain how to select appropriate pesticides and additives (if needed).
- Follow all label instructions and other legal restrictions pertaining to a pesticide application.
- Determine whether two or more pesticides may be tank-mixed.
- Follow the label for safe mixing and loading.
- Describe how to prevent pesticide contamination of water sources during mixing, loading, and cleaning.
- List what personal protective equipment to wear during mixing, loading, and cleaning.
- Explain how to open pesticide containers and transfer the contents safely.
- Measure pesticides accurately using proper utensils and devices.
- Discuss how to rinse and dispose of pesticide containers properly.
- State some basic procedures that ensure the correct application of pesticides.
- Describe how to clean and properly store application equipment after use.
- Explain the basics of professionalism for pesticide applicators.



**P**lanning is essential before beginning a pesticide application. To help plan, you should know how to:

- Select the right pesticide for the job.
- Review the label.
- Test for pesticide compatibility before mixing.

- Choose what personal protective equipment to wear.
- Transfer pesticides safely.
- Clean up after an application.

Careful planning and consideration of all details is the hallmark of professionalism.

## SELECTING THE PESTICIDE

Choosing the right pesticide for your particular situation is critical to determine whether the pesticide can be used safely under the application conditions. You also need to determine how much product is required for the area you are treating.

Before purchasing or applying the pesticide, read the label to determine:

- The safety measures to follow.
- Where you can legally use it (i.e., target sites).
- When to apply it (considering factors such as the life cycle of the pest, weather conditions, preharvest and/or grazing interval, and the rotational or replanting interval).

- How to apply it (e.g., selecting and setting up equipment; following label directions).
- If there are any special use restrictions (e.g., restricted-entry intervals or prohibitions against certain types of application methods or equipment).
- Whether there are other restrictions (e.g., environmental conditions, setbacks or buffers, and drift warnings).

Some labels require you to add an adjuvant (or additive) to the spray mixture to improve mixing or application, or to enhance pesticidal performance. See Chapter 4 (Pesticide Formulations) for a more detailed discussion of spray adjuvants.



*Always read the label before applying the pesticide.*

## REVIEWING THE PESTICIDE LABEL

As you learned in Chapter 3 (Pesticide Labeling), it is important to review the label carefully and to apply the pesticide as directed on the product label. The “Directions for Use” section lists the various crops, animals, or sites on which you may legally use the pesticide.

Under this subheading, the label lists the target pests, application rates, spray quality (droplet size) specifications, and general application methods. You should also consult the label on sprayer cleanout as well as proper storage and disposal of the pesticide and empty containers.

## DETERMINING PESTICIDE COMPATIBILITY

As discussed in Chapter 4, tank mixing two or more pesticides saves time and labor. In some cases, however, it can impair the effectiveness of one or more of the products. For this reason, you should determine the compatibility of your products before mixing them.

Pesticides are **compatible** when they can be mixed and applied in combination without reducing the effectiveness or changing the physical and chemical properties of the mixture. When problems develop from mixing two or more products together, the chemicals are **incompatible**. There

are two main types of incompatibility: physical and chemical.

**Physical incompatibility** is the failure of pesticide products to stay uniformly mixed in the spray tank. Physical incompatibility may result in a putty or paste formation, a separation into layers, or a mixture that looks like cottage cheese (precipitates). This mixture may clog screens and nozzles and will not control target pests.

Physical incompatibility may be caused by:

- Improper mixing procedures.

- Inadequate agitation.
- Lack of stable emulsifiers in some emulsifiable concentrates.
- Mixing with liquid fertilizers.
- Mixing pesticides with hard water (a pH greater than 7).



Physical incompatibility results in an unsprayable mixture, in this case, excessive foaming.

**Chemical incompatibility** occurs when mixing certain pesticides in the spray tank alters the activity of one or more of them. In other words, a chemical reaction takes place and produces new substances. Clues indicating chemical incompatibility may include heat, a color change, the formation of a gas or a precipitate, the appearance of surface scum or foam, or the formation of gel or “sludge.” The resulting mixture is different from the products applied separately. There are two types of chemical incompatibility. In the first type, the pesticidal activity of at least one of the components is reduced when two or more products are mixed. In the second type, the activity of two or more products applied together may be greater than if each pesticide were applied separately. This added effectiveness may weaken the selective nature of the individual products and damage target plants.

Some pesticide product labels list pesticides (and other chemicals) known to be compatible with that formulation. Many have very helpful tank-mixing instructions. If you cannot find information about tank mixing on one or more products you wish to combine,

do a “jar test” (see below) with a small amount of the mixture before you mix a large quantity.

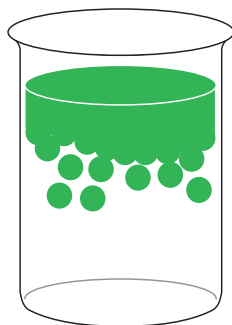
Remember, it is illegal to mix pesticides with other products (e.g., other pesticides, adjuvants, or carriers) when such mixtures are expressly prohibited on the label. Also, if a tank mix contains a pesticide that has a higher toxicity level (e.g., DANGER) than the other pesticides (e.g., WARNING or CAUTION), treat the entire mixture according to the more restrictive signal word (e.g., as a DANGER pesticide). You must use the required safety equipment and follow all other label requirements found on the label with the greatest restrictions.



In this case of chemical incompatibility, mixing pesticides reduced their effectiveness, allowing weeds to grow along with the corn.

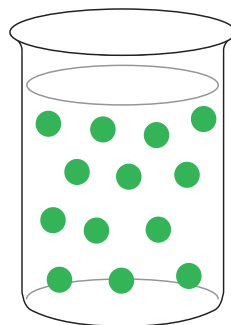
## Conducting a Compatibility Test

To conduct a jar (compatibility) test, use a small glass or plastic container. Mix proportionate amounts of all the carrier and products you intend to combine in the spray tank. Start by filling the jar one-fifth to one-half full with the carrier (water or liquid fertilizer). Then add proportionate amounts of each product, one at a time, in the order suggested under “Making Tank Mixes” (below). Shake the jar thoroughly after each product is added. Allow the mixture to stand for 10 to 15 minutes. If flakes, sludge, gel, precipitates, or other solids form; the products



Clumping and separation

**INCOMPATIBLE**



Smooth, uniform mixture

**COMPATIBLE**

A jar test indicates whether two or more pesticides can be safely mixed.

Adapted from *The Safe and Effective Use of Pesticides*, University of California



separate into layers; or heat is given off, the products cannot be safely tank-mixed. Adding compatibility agents may improve the mixing of the ingredients. Certain kits can help you test for compatibility. There are also online sources as well as smartphone apps to help you determine the proper mixing order for various tank mix components.

### **Making Tank Mixes**

To minimize compatibility problems with tank mixes, follow correct

mixing procedures (see inset). Add and thoroughly mix the products, one at a time, beginning with those hardest to mix.

To ensure thorough mixing of dry formulations before adding them to the mixture, make a preslurry—mix the products with a little water to form a paste before adding them to the tank mix. To be certain you have a uniform spray mixture at all times, keep the mixture agitated during the entire application until the tank is empty.

#### **Tank Mixing Order**

1. Fill tank one-fifth to one-half full with carrier (e.g., water or liquid fertilizer). Start agitation.
2. Add compatibility agent (if needed).
3. Add suspension products: first, dry formulations—wetabletable powders (WP), dry flowables (DF), water-dispersible granules (WDG) (as a preslurry, if necessary), then liquids—flowables (F), liquids (L), microencapsulated (ME).
4. Add solution products—solutions (S), soluble powders (SP).
5. Add surfactants or other adjuvants (if needed).
6. Last, add emulsion products—emulsifiable concentrates (EC).

## **FOLLOWING SAFE MIXING AND LOADING PRACTICES**

**P**eople who mix and load concentrated pesticides have an especially high risk of accidental exposure and poisoning. Observe the following precautions to reduce the risks involved with this part of the job.



*Locate the pesticide mixing and loading site outdoors or in a well ventilated area.*



*Observe all precautions when mixing and loading pesticides.*

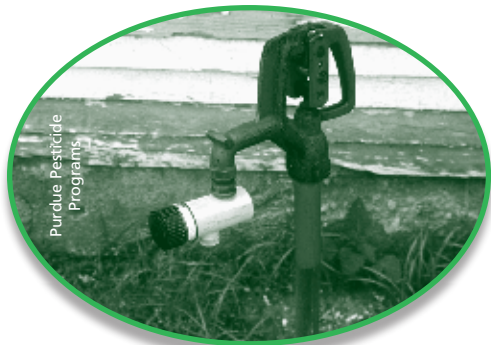
### **Select an Appropriate Mixing and Loading Area**

Locate the pesticide mixing and loading area in a well-ventilated (if indoors), well-lighted place away from people, animals, food, and other items that might be contaminated.

## Protect Water Sources

Ensure that no tank mixture can back-siphon into a water source. When filling a mix tank using a water pipe or hose, place the pipe or hose end well above the surface of the pesticide mixture, leaving a distinct air gap between the two. If water is pumped directly from the source into a mix tank, use a check valve, anti-siphoning device, or backflow preventer to prevent back-siphoning if the pump fails. The backflow preventer has a mechanism that automatically closes if a drop or loss of water pressure occurs. Check valves are crucial for **chemigation** and similar systems where pesticides are injected into irrigation water.

Mix pesticides in areas where any spills, leaks, and overflows cannot flow toward a drain or into water sources. If using a permanent mixing and loading site, use a containment pad (see Chapter 11, Pesticide Application Procedures). When possible, mix and load the pesticides at the application site. Be careful



Use a backflow device when water is pumped directly from the source.



Leave a distinct air gap between the hose and the surface of the pesticide mixture to prevent back-siphoning.

not to use the same site repeatedly, and do not contaminate any water sources.

## Use Personal Protective Equipment

Be sure to wear appropriate personal protective equipment (PPE) when handling pesticide containers, even before opening them. Pesticide handlers must wear all of the PPE that the pesticide labeling requires. This may include:

- **Body protection**—Wear a bib-top apron made of butyl, nitrile, or foil-laminate material in case you get splashed while mixing and loading or come in direct contact with contaminated equipment. The style that includes built-in gloves and sleeves is especially protective.
- **Face protection**—Wear a face shield to keep splashes and dusts off your face, nose, and mouth while pouring liquid pesticides or adding dry pesticides to a liquid.
- **Respiratory protection**—Wear the appropriate respirator when handling pesticides. Choose one with the National Institute for Occupational Safety and Health (NIOSH) code given on the pesticide product label.
- **Eye protection**—Wear shielded safety glasses, goggles, or a face shield to protect your eyes.

## Open Containers Carefully

Do not tear open paper or cardboard containers. Use a sharp knife or scissors. This reduces the danger of spilling and makes bags easier to close after use. Clean the knife or scissors afterward, and do not use them for other purposes. To prevent spills, close containers after each use even if you plan to mix more of the same pesticide.



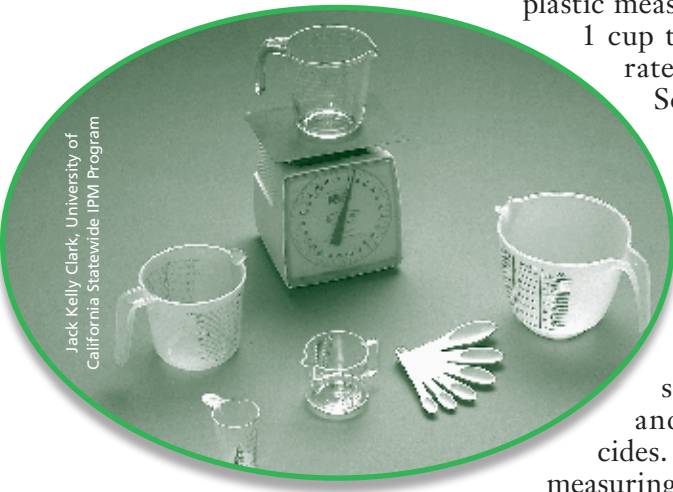
Use a sharp knife to open pesticide bags and wear appropriate PPE.

## Measure Accurately

Liquids and some granular pesticides are measured by volume; dusts, powders, and most dry formulations are measured by weight. Pesticide labels use the English system of measurement (i.e., fluid ounces, pints, quarts, and gallons for liquids; pounds and ounces for dry materials). Use an assortment of glass or plastic measuring utensils, from 1 cup to 1 gallon, to accurately measure liquids.

Some pesticides react with metal—especially aluminum and iron—so avoid using metal measuring utensils.

Use an accurate scale and a set of measuring cups and spoons to measure and weigh dry pesticides. Mark each pesticide measuring item clearly to avoid using it for other purposes. To prevent accidental poisonings, paint handles with brightly colored waterproof paint or attach waterproof warning labels. After each use, clean and wash utensils before storing them to prevent contaminating future mixtures. When you are not using them, keep all measuring and weighing equipment and utensils locked in the pesticide storage area.



Jack Kelly Clark, University of California Statewide IPM Program

Accurately measure pesticides.



Virginia Tech Pesticide Programs

When transferring wettable powders, dusts, or other dry formulations, avoid inhalation of dusts.

## Transfer Pesticides Carefully

After measuring or weighing the correct amount of pesticide, carefully add it to the partially filled spray tank. When pouring, keep the container and pesticide below face level. If there is a breeze outdoors or strong air current indoors, stand so the pesticide cannot blow back on you. Rinse the measuring container thoroughly and pour the rinsate into the spray tank. Use caution while rinsing to prevent splashing. Never leave the spray tank unattended while it is being filled.

When transferring wettable powders, dusts, or other dry formulations, avoid spillage and inhalation of dusts.

## CLEANING AND DISPOSING OF PESTICIDE CONTAINERS

Follow the container-handling instructions on the pesticide label. The instructions will tell you how to clean and dispose of an empty container. Not all containers must be **triple-rinsed** or **pressure-rinsed**. If rinsing is required, follow the directions on the label and rinse immediately after emptying the container. Otherwise, residues may become difficult to remove if allowed to dry. If possible, add the rinsate to the next application.

Do not leave pesticide containers unattended at a mix-

ing, loading, or application site—return them to a secured storage area until they can be recycled or disposed of properly. Clearly mark and safely store them. Follow the label directions on what to do with an empty container.

If a pesticide label says it is a “refillable” container, it will have instructions to return the container to the pesticide dealer or manufacturer for refilling. Never tamper with a container designed to be returned and refilled. If it is a “nonrefillable” container, the label will tell you whether you can recycle, recondition, or dispose of the container and the manner of disposal. Never reuse pesticide containers. If recycling is an



Triple-rinse containers.



option, check with your state, tribe, or territory pesticide regulatory agency or the Ag Container Recycling Council ([www.acrecycle.org](http://www.acrecycle.org) or 877-952-2272) to locate a pesticide container recycling program.

## Container Rinsing Procedures

**For small containers 5 gallons or less, triple rinse as follows:** Empty the remaining contents into application equipment or a mix tank (drain for 10 seconds after the flow begins to drip). Fill the container one quarter full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times.

**For containers too large to shake (i.e., with capacities more than 5 gallons or 50 pounds), triple**

**rinse as follows:** Empty the remaining contents into application equipment or a mix tank. Fill the container one-quarter full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, making at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Turn the container over onto its other end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Repeat this procedure two more times.

**For bags or liners:** Completely empty bag or liner by shaking and tapping sides and bottom to loosen clinging particles. Empty residue into application equipment or a mix tank or store for later use or disposal.

**To pressure rinse containers:** Empty the remaining contents into application equipment or a mix tank (drain for 10 seconds after the flow begins to drip). Hold container upside down over application equipment or a mix tank or collect rinsate for later use or disposal. Insert pressure-rinsing nozzle in the side of the container and rinse at about 40 pounds per square inch for at least 30 seconds. Drain for 10 seconds after the flow begins to drip.



*A pesticide container recycling center.*

Purdue Pesticide Programs



*Pressure rinsing directs high-pressure water into the container.*

## APPLYING PESTICIDES CORRECTLY

**A**pplicators have many important responsibilities when applying pesticides: protecting themselves, others, and the environment and making sure the pesticide is applied correctly. This means using proper PPE and following correct application procedures.

### Personal Protective Equipment

By law, applicators must wear the PPE and other clothing the pesticide labeling requires. Consider using addi-

tional protection for some types of pesticide application tasks.

### Hand-Carried and Backpack Applications

Exposure is quite likely when applying pesticides using hand-held equipment or dust shakers. Dripping or partially clogged nozzles, leaky hoses, and loose equipment connections are other potential sources of exposure.

Many applications performed on foot cause the applicator to walk



M.J. Weaver, Virginia Tech Pesticide Programs

*Wear appropriate protective PPE whenever you must walk into the path of a pesticide application.*

into the path of the pesticide being applied. Whenever possible, apply pesticides so you are backing out of the treated area. If you must walk into the path of the pesticide, consider wearing shin-high or knee-high rubber boots (or other protective footwear) with spray-resistant or waterproof pants. Wear appropriate protective clothing and equipment when entering treated areas to fix clogged nozzles or other malfunctioning equipment parts.

### **High-Exposure Applications**

Certain types of pesticide applications are especially risky because they may expose the applicator to large amounts of pesticide. These include:

- Mist blower or air-blast sprayers.
- Aerosol and fog generators.
- High-pressure sprayers and power dusters.
- Equipment that directs applications overhead, such as to tree canopies or roof eaves.



Tom Bowman, Virginia Tech Pesticide Programs

*In high-pressure spray applications, consider wearing more PPE than the label has listed.*

Pesticide exposure is likely whenever you are working in these situations. For high-exposure applications, use appropriate gloves, protective coveralls with a hood, footwear with sealed cuffs, and a full-face respirator or half-face respirator with sealed goggles.

Pesticides are sometimes applied in enclosed spaces, such as warehouses, factories, restaurants, and homes; railcars; ship and truck cargo areas; silos, elevators, and other grain storage areas; and greenhouses. This increases the risk of inhalation and dermal exposure. Wear an approved respirator and additional protective clothing, even if you would not need them for the same application outdoors.

### **Application Procedures**

To ensure that pesticides are being applied properly, follow these basic procedures:

1. Before applying a pesticide, clear all people and pets from the area. Remove toys and pet dishes from the application area and cover garden furniture, swimming pools, and birdbaths. Even for narrowly directed pesticide applications (such as crack-and-crevice treatments), keep people and animals out of the immediate area during the application. Check the pesticide label to find out when it is safe to return to the application area. If the label does not include specific restricted-entry statements, keep people and nontarget animals out of the treated area until the spray has dried or the dust has settled.
2. Ensure that the pesticide is reaching the target surface or area. Be sure to remove granules from sidewalks and other nontarget areas.
3. Apply the pesticide evenly and in the correct amounts. Do not allow liquid pesticides to form puddles or dry pesticides to pile up in the application area. Be especially careful in places where you turn or pause your equipment. You may have to shut off your equipment in these areas. After applying the



pesticide to the first part of the target site, check to be sure the right amount of pesticide has been used.

4. Ensure that the pesticide maintains a uniform mix or appearance during the application. Several pesticide formulations mixed with liquid require agitation to remain in suspension. Granules and dusts should appear dry and not form clumps on the target site.
5. Check hoses, valves, nozzles, hoppers, and other equipment parts often during the application.
6. Turn spray equipment off when you pause for any reason. Agitation must be maintained if the spray mix is a suspension of particles (such as wettable powders, flowables, or dry flowable formulations). Whenever you stop an application, depressurize spray tanks. Turn off the main pressure valve on the tank and release the pressure remaining at the nozzles.
7. Check the label for any postapplication requirements, such as incorporating the pesticide into the soil.

## CLEANING UP AFTER MIXING, LOADING, AND APPLICATION

**A**fter mixing, loading, or applying a pesticide, clean the pesticide equipment and yourself thoroughly. While the facts are still fresh in your mind, record all information about the application to comply with pesticide recordkeeping laws.

Do not leave equipment containing pesticides at the mixing and loading or application sites. Avoid washing equipment repeatedly in the same location unless you use a containment pad or tray.

Instruct everyone who cleans pesticide-contaminated equipment on proper safety procedures. Equipment cleaning presents as great a risk of pesticide exposure as do many other pesticide-handling tasks. When cleaning pesticide-contaminated equipment, wear the same PPE that the labeling requires for making applications, plus a chemical-resistant apron or other appropriate protective equipment. Consider wearing eye protection even if not required by the label.

### Cleaning Procedures

After the equipment is empty, clean both inside and outside thoroughly, including nozzles or hopper openings. Certain pesticides (e.g., petroleum-based products) use a carrier that may require special cleaning agents or high water pressure to get the equipment clean.

### Rinsates

**Rinsates** from equipment that has been cleaned contain pesticides and can harm people and the environment. Do not allow rinsates to flow into water systems, including sink or floor drains, storm sewers, wells, streams, lakes, or rivers. If possible, rinse your equipment at the application site. Also, collect and apply rinsates to labeled sites at or below label rates.

Equipment rinsate may also be used as a diluent for future pesticide mixtures provided the:

- Pesticide in the rinsate is labeled for use on the target site where the new mixture will be applied.
- Amount of pesticide in the rinsate plus the amount of pesticide product in the new mixture does not exceed the label rate for the target site.
- Rinsate is used to dilute a mixture containing the same or a compatible pesticide.

**Collect rinsate and apply to a labeled site at or below labeled rates.**

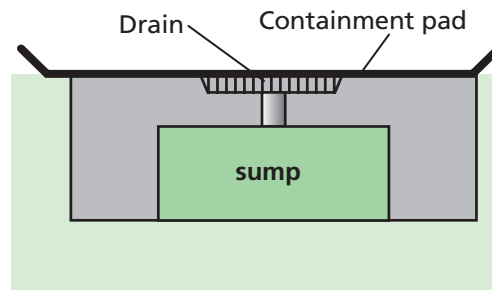


*Be sure to wear appropriate PPE when cleaning application equipment.*

Rinsate may not be added to a pesticide mixture if it:

- Contains strong cleaning agents (such as bleach or ammonia) that might harm the plant, animal, or surface to which the pesticide will be applied.
- Would alter the pesticide mixture and make it unusable; for example, if the pesticides are physically or chemically incompatible.

If rinsates cannot be used, dispose of them according to the label as you would waste pesticides.



*A mixing and washing pad may require a sump that can be pumped out to collect rinsate after each use.*

### Equipment Cleanup

Clean your equipment thoroughly after each use or when changing chemicals. Pesticide residues can corrode metal, plug hoses, or damage pumps and valves unless removed immediately after use. Sometimes residues react with pesticides used later, reducing the effectiveness of the pesticides. Special tank-cleaning nozzles are available to clean the interior walls of spray tanks.

For all application scenarios, make sure the entire spray system is cleaned, not just the tank. This is especially true for commercial row-crop boom sprayers. Besides the spray tank, problem spots for pesticide contamination include the **eductor** (sometimes called an inductor); plumbing, which includes valves and hoses; filters and screens; boom segments; nozzle bodies; and nozzles and screens. When possible, thoroughly rinse equipment with

a strong water-detergent solution (8 to 16 ounces of detergent in 30 to 40 gallons of water). Allow the water-detergent solution to circulate through the system for several minutes. Remove the nozzles and screens, then flush the sprayer system twice with clean water. Some pesticide labels may require triple rinsing to rid the spray system of any possible pesticide contamination. Regardless of how the spray system is cleaned, make sure all visible deposits are removed.

Sloppy cleanup practices are one of the main causes of equipment failure or malfunction. Pesticides allowed to dry in the application equipment tend to clump and stick and cannot be easily removed. These deposits may eventually dissolve into the spray solution. Thus, improper cleanup may lead to contamination of tank mixes and damage to susceptible crops.

Several commercial compounds will aid in tank cleaning. These can neutralize and remove pesticide residues, remove mineral deposits and rust, and leave a protective film on tank walls to help prevent corrosion.

When preparing to store your sprayer, add 1 to 5 gallons of light-weight oil (depending on the size of the tank) before the final flushing. As water is pumped from the sprayer, the oil leaves a protective coating on the inside of the tank, pump, and plumbing. To prevent corrosion, remove nozzle tips and screens and store them in a can of light oil, such as diesel fuel or kerosene. In addition, add a small amount of oil and rotate the pump four or five revolutions by hand to coat interior surfaces completely.

It may be necessary to winterize the spray system to prevent damage from freezing temperatures. Be sure to either drain all water from the spray system or replace the water in the pump and other critical parts with an antifreeze material (RV antifreeze is commonly used).

After thoroughly cleaning and draining the equipment, store it in a dry, clean building. Replace worn-out, deteriorated, or broken parts. If you store the sprayer outside, remove the hoses, wipe them clean of oil, and store

them inside where they will not become damaged. When using trailer sprayers, you may want to put blocks under the frame or axle to reduce tire pressure during storage.

As with any pesticide-related procedure, remove contaminated clothes and take a shower immediately

after cleaning equipment. Waiting until the end of the day to clean up may allow additional absorption of the pesticide through the skin. See Chapter 6 (Personal Protective Equipment) for detailed information on how to clean pesticide-contaminated clothing.



Take a shower immediately after using pesticides.

## PROFESSIONALISM

**A**s a pesticide applicator, you do important work and provide valuable services. These services include:

- Producing a safe and plentiful food and fiber supply.
- Protecting public health from vector-borne diseases.
- Creating value for property owners through their landscapes and structures.
- Protecting land and water ecosystems from invasive species.
- Enhancing the public's quality of life through parks and other recreation venues.
- Creating safe roadways and other rights-of-way.

So far, this manual has provided you with information on how to safely, properly, and effectively manage pests and use application equipment. Another consideration is your professionalism as a pesticide applicator.

What you do and how well you handle yourself while on the job will leave an impression on others. These expectations of conduct and your actions in specific situations create your professional image, best summed up as “professionalism.”

### What Is Professionalism?

Merriam-Webster defines professionalism as “*the skill, good judgment, and polite behavior that is expected from a person who is trained to do a job well.*” The heart of professionalism for a pesticide applicator is exercising good judgment when there are no clear-cut right or

wrong options. Professionalism includes fair treatment of customers, respect for others, and being an asset to your community.

While regulatory compliance is necessary, you as an applicator or a supervisor will need the expertise and good judgment to make decisions on issues affecting security, safety, health, or the environment not addressed by regulations or the pesticide label. You should:

- Study this manual to help you acquire the basic knowledge needed to educate your customers and others who are concerned about pesticides.
- Educate others about the work you do.
- Know how to minimize risks to yourself, coworkers, the public, and the environment.
- Learn how to communicate the benefits and risks of pesticide use with your customers, coworkers, and the public.

The impression you make on others depends on your ability to answer questions from customers, neighbors, and others about the work you do.

### Demonstrate Professional Ethical Standards

A professional demonstrates ethical behavior in all aspects of his or her work. This means not taking shortcuts that may harm your customers, the public, or the environment. Offer honest and knowledgeable advice, keeping in mind the best interests of



others. Integrated pest management is also part of your professional training because it helps you make sound pest management decisions, apply pesticides only when needed, and protect sensitive sites from harm.

### **Communicate with Customers, Neighbors, and the Public**

Being a professional involves knowing the correct terminology when discussing your work and communicating with others. When speaking with the public, it is better to use simple, direct language than to use technical jargon. Be proactive and reach out to neighbors, customers, and others who may have concerns about a nearby sensitive site where you are applying pesticides. Inform others that you are a professionally certified and trained

pesticide applicator. Explain what that means because many people will not know. Be familiar with your company or organization policy for talking to customers, neighbors, or the media.

Keep accurate records of all your pesticide applications. Good records provide the facts of what you did and demonstrate your care in the work you do. If there is a complaint or legal action following an application, having good records may be your most valuable defense. Having no or insufficient records makes you vulnerable to baseless accusations and additional scrutiny.

In a nutshell, being an effective pesticide applicator is more than just the skills and knowledge needed to conduct an application. It also requires good judgment, polite behavior, and a professional demeanor.

## **SUMMARY**

**A**pplying pesticides correctly requires careful planning, especially when making tank mixes. Pesticide labels do not always specify whether products can be tank-mixed. Therefore, applicators must know how to conduct a compatibility test to determine which products can be safely mixed.

Safe mixing and loading practices include selecting an appropriate mixing and loading area, protecting water sources, and using appropriate PPE. Rinsable containers must be triple- or pressure-rinsed, properly disposed of, or recycled. Empty nonrinsable containers

as completely as possible before disposing of, recycling, or refilling them.

When applying pesticides, protect yourself and the environment by wearing appropriate PPE and removing all people and pets (nontarget organisms) from the area to be treated.

After mixing, loading, and applying pesticides, be sure to clean equipment and yourself properly. If possible, reuse application equipment rinsates as a diluent in a spray mixture containing the same or a compatible pesticide. Apply the rinsates to a labeled site at or below the label rate.

## Review Questions

### CHAPTER 10: PLANNING THE PESTICIDE APPLICATION

Write the answers to the following questions, and then check your answers with those in Appendix A.

- Determining *when* to apply a pesticide includes considering the:**
  - Life cycle of the pest and weather conditions.
  - Percent active ingredient.
  - Need for additives or adjuvants.
- The “Directions for Use” section of a pesticide label indicates the:**
  - Various crops or areas on which the pesticide may be legally used.
  - Disposal of pesticide waste.
  - Environmental, physical, and chemical hazards.
- When two or more pesticides mixed together form a putty or paste, separate into layers, or look like cottage cheese, it is an example of:**
  - Limited agitation.
  - Chemical incompatibility.
  - Physical incompatibility.
- After filling a tank one-fifth to one-half full with carrier, what is the usual order for tank mixing the remaining products?**
  - Add suspension products, add emulsion products, add solution products, add surfactants (if needed), add compatibility agent (if needed).
  - Add compatibility agent (if needed), add suspension products, add solution products, add surfactants (if needed), add emulsion products.
  - Add surfactants (if needed), add suspension products, add emulsion products, add solution products, add compatibility agent (if needed).
- Which statement about the proper technique for opening pesticide containers is *true*?**
  - Put on the appropriate PPE after the containers have been opened.
  - Use a sharp knife or scissors to open paper or cardboard containers.
  - Leave the container open until you have finished mixing pesticides for the day.
- Which statement about measuring and/or transferring pesticides is *true*?**
  - Metal measuring utensils are recommended over plastic.
  - Most dusts, powders, and dry formulations are measured by volume.
  - After adding the pesticide to the partially filled spray tank, rinse the measuring container and pour the rinse solution into the tank.
- Which statement about cleaning and disposing of pesticide containers is *true*?**
  - Do not puncture rinsed pesticide containers.
  - Pesticide containers that cannot be recycled or returned to the manufacturer should be reused.
  - Containers must be disposed of in accordance with label directions and current regulations.

continued 

8. Which statement about triple-rinsing and pressure-rinsing pesticide containers is *true*?
- A. Triple rinsing is a more effective method than pressure rinsing.
  - B. All containers must be either triple-rinsed or pressure-rinsed.
  - C. Rinsate from triple rinsing or pressure rinsing may be stored for later use.
9. Which statement about pesticide rinsates is *true*?
- A. Rinsates may be applied to labeled target sites at or below labeled rates.
  - B. Rinsates containing strong cleaning agents may be reused in pesticide mixtures.
  - C. The amount of pesticide in the rinsate plus the amount of pesticide product in the new mixture may exceed the label rate for the target site.
10. Which statement about pesticide equipment cleanup is *false*?
- A. Sprayers should be thoroughly rinsed with a water-detergent solution for several minutes.
  - B. When getting ready to store your sprayer, add some lightweight oil to the tank before the final flushing.
  - C. Leftover pesticide residue in the spray tank is permitted when changing products.