

Pesticide Applications in the Interiorscape

Because conditions are so varied in the interiorscape, no single pest control program can be suggested. Chances of success using proper pesticides is possible only when the correct material is applied in the correct manner at the correct time to a susceptible stage of the pest. Make certain that interiorscapes and the target pest or disease is on the pesticide label.

Maintenance or preventative sprays may be applied every one to three weeks, depending upon the pest, time of year, and residual activity of a pesticide. An effective maintenance spray program should control any initial invaders and prevent pest populations from developing. It is much easier to maintain pest-free plants than to control established populations. If a preventative program is not used, it will be necessary to inspect plants closely at frequent intervals and apply control measures before pests reach damaging levels.

Spray Applications

Many pesticides are broken-down (hydrolyzed) in the spray tank when mixed with water above pH 7. Be aware of the water pH and when above 7 a buffering solution should be added to **maintain pH in the 6.5 to 7 range.**

Sprays should be **applied only to thoroughly wet the foliage. Excessive volume or concentration of any pesticide may cause phytotoxicity. Both leaf surfaces, especially the underside, must be sprayed.** Proper mixing by adequate mechanical agitation in the spray tank is necessary for best results. For safety and efficacy pesticides should be applied the same day they are mixed with water.

To obtain better coverage and residual persistence of the pesticide, an adjuvant may be recommended. Read the container label and use the material at the concentration specified by the manufacturer. Different pesticides may require different types of adjuvants and the **wrong adjuvant may reduce the effectiveness of some pesticides.** Some formulations already contain the necessary adjuvants. **Always check the label before selecting and using an adjuvant or assessing if one is needed.** If you are using a new spreader-sticker, be careful to evaluate it for any phytotoxic effects on just a few plants. Phytotoxicity can vary by plant species or growth stage.

Formulations

The formulations discussed below are those most commonly used with indoor plantings.

Granular Applications (G)

Granular materials are **applied to the surface of the growing media** in a manner to insure even distribution over the media surface. These are used against pests in the media or with pesticides that have systemic activity. **DO NOT apply them to wet foliage. Following surface application of granular pesticides, the media surface should be watered thoroughly to leach the pesticide into the upper layer of media.** This precaution will make the pesticide quickly available to the plants and position the granules where they are less likely to be contacted by those using the building.

Wettable Powders (WP)

Wettable powder formulations are mixed into water and leave long lasting, uniform residues. Although wettable powders are **considered safer to plants** than some other formulations, they frequently **leave objectionable residues on the foliage**.

Emulsifiable Concentrates (EC)

Emulsifiable formations are liquids that are dissolved in petroleum distillates, sometimes called organic solvents. These form an emulsion when mixed with water. These may cause plant injury in some situations and **should not be used on ferns**.

Suspension Concentrates (SC) and Flowables (F)

These are suspensions of an insoluble pesticide and are **less likely to cause phytotoxicity than emulsifiable concentrates**. They often provide more uniform coverage than wettable powder formulations. SC formulations need to be agitated periodically as they settle out over time.

Water Dispersable Granules (WDG)

Unlike standard granules, these are designed to be mixed with water in the spray tank to dissolve and form a suspension before application. WDGs have less dust than wettable powder formulation. These are simple to measure but **need some time to thoroughly dissolve**.

Compatibility

Spray tank mixtures of insecticides, miticides or fungicides may result in plant injury that does not occur from use of any one of the materials alone. Before materials are tank mixed, study the manufacturer's label carefully. Mixing pesticides that require different types of adjuvants should be avoided. It is best to treat just a few plants with a new combination of pesticides and wait a week for any phytotoxic effects to appear.

Phytotoxicity

Phytotoxicity is generally **characterized by damage to foliage, usually exhibited as marginal burn, chlorosis or spotting**. Plants grown in an interiorscape may be more susceptible to damage. **Distortion or abnormal growth** is also a common symptom of plants injured by pesticides. Although any portion of the plant may be affected, the new growth is most likely to show damage.

Because many plantscapes are usually located adjoining large glass areas, plant damage can be minimized when pesticides are applied during the cooler part of the day. **Avoid applications during hot, sunny weather or when the plants are stressed.**

Read the label for plants that are sensitive to the pesticide. Regardless of the pesticide or mixture of pesticides used, it is strongly recommended that the effects be evaluated on a few plants, under your particular condition before treating all plants. There may be several formulations of a chemical compound available. Concentrations vary and consequently recommendations on the manufacturer's label should be followed explicitly.

Best Practices With Pesticides

All pesticides must be handled with caution. Some pesticides are more toxic than others. Pesticide labels displaying the signal words “DANGER-POISON” are highly toxic need to be handled with extreme care and are not typically used in interiorscapes. Labels with the signal word “WARNING” are moderately toxic and those with “CAUTION” are least toxic.

Pesticide Safety Practices

- A **notebook containing all pesticide labels** for the products used on site and **safety data sheets (SDS)** must be available and accessible at the site for interiorscape technicians. Technicians can use this notebook to obtain complete information associated with the pesticides that are being used.
- Safety precautions, including the use of proper personal protective equipment (PPE), printed on the label must be followed.
- Pesticides **must be labeled for interiorscapes** and that you have a label in possession when using them.
- Read the entire label, including the small print, before opening the container. Labels are designed to protect personnel who are going to apply the pesticide.
- Use all of the personal protective equipment as listed on the label. Avoid getting pesticides on your skin or in your eyes or near your mouth nose or eyes. If you get pesticide on your skin, promptly wash the area with soap and clean water. If any pesticide gets in your eyes, flush your eyes with clean water for 15 minutes and seek medical attention. After completing the application, wash exposed with soap and water.
- Never smoke, eat, or drink while handling pesticides.
- Do not apply more pesticide than allowed by the label. This can result in plant injury or jeopardize the safety of technicians. This is also a violation of regulations.
- Allow plenty of time after applying pesticides so **plants are completely dry before people are present** in the area.
- Use **low pressure to prevent contamination of non-target areas** (pools, seating and food areas, etc.), spray only to point of glisten (not dripping) and use plastic drop cloths. Drop cloths used for shielding purposes should be handled carefully to avoid exposure.
- Store pesticides in original closed and labeled containers, out of reach of children, irresponsible people, pets, and preferably keep pesticides under lock and key.
- Store application equipment out of reach of children and adults. **Always designate and use one sprayer for insecticides and miticides and another for fungicides.**
- **When containers are empty, rinse with water three times and pour rinsing into spray tank.** Rinse water should be applied to interiorscape plants or plants that have been moved outdoors. Dispose of empty containers promptly and safely.
- Maintain records of your applications.
- **Always launder pesticide contaminated clothing separate from non-contaminated clothing.**

- If you become ill during or shortly after applying a pesticide, seek medical attention immediately. Have the name of the active ingredients of the pesticide for the label. Follow instructions on the label for first aid treatment.

Calibration of Application Equipment

Pesticide applications must be accurately calibrated to be effective and safe. Proper calibration ensures the correct amount of spray is prepared to minimize leftover solutions for disposal. Calibration is the process to determine the correct amount of pesticide to apply to manage a pest or disease. Each type of equipment used to apply pesticides needs to be calibrated. There are two methods used to calibrate equipment; the concentration and volume methods.

The **concentration method** is commonly used for interiorscape pesticide applications when the pesticide label lists rates as concentrations of sprays to be applied. It involves knowing how much water it will take to treat the plants in the landscape and then determining the amount of pesticide to mix in water to obtain the concentration listed on the label.

The procedure for calibrating for concentration method applications consists of the following:

1. Fill the spray that will be used to apply the pesticide with water only.
2. Select a plant representative of those to be treated and apply the water until the leaves glisten (just before run-off).
3. Measure the amount of water used.
4. Multiply the amount of water used by the number of plants to be treated. This is the total volume of water needed for the application.
5. Determine the amount of pesticide to get the desired concentration, as listed on the pesticide label, based on the volume of water determined in the previous step. Add this amount to the water and mix thoroughly.

The **volume method of calibration** is used when the label specifies how pesticide is used per plant or per area to be treated. To use this method you need to know size of the area to be treated and amount of water needed to treat this area. The procedure is as follows:

1. Fill the spray that will be used to apply the pesticide with water only.
2. Measure and mark-off a known area on concrete or asphalt. Spray the area as you would when making the application to plants using the same walking speed, nozzle height, overlapping pattern, and sprayer pressure.
3. Measure the amount of water needed to treat the calibration area of known size.

4. Determine the area in the interiorscape needing treatment. The amount of water need to treat this area is the amount of water used divided by the area in the calibration exercise multiplied by the area needing treatment.

Example:

It took 0.5 gallons of water to treat 250 square feet during calibration.

Plants needing treatment cover an area of 1500 square feet.

Water need = $(0.5 \text{ gal./}250 \text{ sq ft}) \times 1500 \text{ sq ft} = 3 \text{ gallons water}$

5. Determine the amount of pesticide for the area based on the rate on the label.

Example:

The label states that 1.5 fluid ounces is used per 1000 square feet and we have 1500 square feet of plantings to cover.

Divide the area to be treated by 1000 sq ft and multiply by the labeled rate.

Pesticide needed = $(1500 \text{ sq ft}/1000 \text{ sq ft}) \times 1.5 \text{ fl oz} = 2.25 \text{ fl oz}$

6. Mix the measured amount of pesticide with sufficient water to cover the area to be treated. Mix thoroughly and make the application.

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