

# Pesticides and the environment

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**T**his article is the third in a four-part series on general pesticide principles required for the safe use and application of pesticides. The article and subsequent test have been approved for one continuing education unit (CEU) in Core category for pesticide license renewal. The article and test set will be valid for up to one year from the publication date. After one year, they expire and CEU credit will no longer be available.

When they hear the word environment, most often people think of trees, water bodies (ocean, rivers or lakes) and/or ozone layer. However, the environment is everything that is around us; it can be plants, soil, air, animals and also can refer to our storage facilities, office building, or tractor cabs.

Anyone who uses a pesticide must consider how pesticides will affect the environment. Two important questions that pesticide applicators must ask are: 1) How will this pesticide affect the environment at the site where it is applied?, and 2) Is there potential for pesticides to move off-site and cause damage to other areas? Pesticide applicators who use good practices will achieve effective pest control with little risk of environmental damage.

## SOURCES OF CONTAMINATION

When environmental contamination occurs, it is the result of non-point-source or point-source pollution. Point-source pollution comes from a specific, easy-to-identify place at a particular point or location. A spill that runs into a water source is an example of point-source pollution.

Non-point-source pollution comes from a wide geographical area. The movement of pesticides into a water source after a broadcast application could be an example of non-point-source pollution.

It is non-point-source pollution that is most often blamed for pesticide contamination in the environment. However, studies reveal that much of the environmental contamination occurs from point sources. These sources can be commonly found near equipment cleanup sites, pesticide storage sites and mix load sites. Wash water and

spills, along with improper disposal of containers, water from rinsing containers and improperly cleaned-up spills all can act as sources of pollution.

As a pesticide handler, you want to be sure to locate all phases of your pesticide operation at a site that could ensure that any issues are handled properly and in a timely manner. Some things to consider when using pesticides are whether or not there are sensitive areas at or near the site to be treated, if environmental conditions might cause the pesticide to move off-site or if an alternative type pesticide use may reduce the risk of environmental contamination.

## SENSITIVE AREAS

Sensitive areas can consist of living things or areas that are easily injured by a pesticide. Sensitive areas in citrus production include areas where groundwater is near the surface or easily accessed, such as wells and sinkholes. Urban areas with particularly sensitive areas could include schools, playgrounds and/or hospitals. Other sensitive areas may be habitats that are home to endangered species, wildlife refuges or parks. Leaving untreated buffer zones around sensitive areas is often a practical way to avoid possibly contaminating them.

Sometimes pesticides must be deliberately applied to a sensitive area to control a specific pest. The applications should be performed by well-qualified individuals who have been trained on how to avoid injury to these areas. Pesticide labels may have specific setback distances from sensitive areas.

## PESTICIDE MOVEMENT

Pesticides moving off-site can be problematic. Pesticide movement can be in the air, water, plants, animals or objects. Drift is the movement of pesticide through the air. Pesticide particles, dusts, spray droplets, and vapors may be carried off site in the air. Obviously the smaller and lighter the particles, the more easily they are carried by moving air.

High-pressure and nozzles producing very small spray droplets are more likely to drift in the windy conditions. The likelihood that pesticide particles and spray droplets may drift off site depends partly on the way they are ap-

plied. Applications made close to the ground are not as likely to get caught up in air currents as those released or directed at a higher elevation. Pesticides that are applied in an upward direction or from an aircraft have a greater chance of being carried on air currents.

In the citrus industry, with increased applications of pesticides for psyllid control and with newly designed application equipment being utilized, we need to be even more aware of weather conditions for effective applications while minimizing the potential of drift. Always refer to the label as to suitable weather conditions for application of a particular pesticide.

Another way that pesticides can be moved off-site is via water. Pesticides can drift, leach or run off and enter into water or water ways. Leaching is of particular concern on porous sandy soils like those present on the Ridge, whereas runoff is more likely to occur on soils with clay or a clay layer, such as found in the flatwoods. Leaching or runoff can occur if too much pesticide is applied, spilled or leaked onto a surface. Also, excessive rainwater or irrigation can cause problems with runoff or leaching.

When applying a pesticide to the soil, make sure to check on forecasted weather conditions for the time period and location of the application. Also, you may want to adjust your irrigation schedule or pesticide application to avoid any unwanted pesticide movement.

Off-site movement of pesticides can also occur on clothing, shoes, animal fur or equipment. Pesticides on clothing can be transferred to vehicles, furniture, carpeting or any object that comes in contact with the residual materials. This is why you want to make sure that you wear the appropriate personal protective equipment, which will be described on the label.

Pesticide tolerances (legal limits) are established for how much pesticide can remain on a crop and are in place to protect harvesting laborers and consumers. If you are using the products according to their labels, crops will not exceed established tolerances. Illegal pesticide tolerances usually result when excessive pesticide has been applied (more than labeled rate), post harvest interval time has not been

followed or contamination has occurred from off site.

## **HARMFUL EFFECTS FROM PESTICIDES**

Pesticides can potentially harm non-target organisms that are present during a pesticide application. If pesticide applications are poorly timed, they can kill bees or other beneficial pollinators. When applying pesticides to large areas to control pests, selection of proper pesticides is critical to minimize any harmful effects. Pesticide residuals can remain in the environment for a period of time following an application or spill. Depending on the chemical breakdown, it can be rapid (less than a day) or slow (several years). The rate of breakdown depends on the chemical structure of the pesticide's active ingredient. Other

factors such as pH, moisture, presence or absence of microorganisms, temperature and exposure to sunlight can impact the amount of time required for the chemical to breakdown.

Persistent pesticides have long residual periods which are sometimes desirable for controlling weed pests such as broadleaves and grass weeds in citrus. Due to their persistence, extra care should be taken not to spill or overapply these chemicals.

Accumulation of pesticides occurs when pesticides build up in the bodies of animals or in the soil. When the same mixing/loading site or equipment cleaning site is used repeatedly, pesticides are likely to accumulate in the soil. This accumulation creates a higher likelihood that pesticides may move off site and contaminate the surrounding environment or move into

surface or groundwaters. When pesticides accumulate on surfaces, they may become discolored.

To have a successful and safe pesticide program, you must take into account the environment in which you are working. Make sure that weather conditions are appropriate for the type of application you are planning. Waiting for the appropriate weather will help in a successful application and help ensure that the pesticide is applied to the desired area. By understanding how pesticides can become sources of contaminants, their effects and movement, you will minimize any potential for negative impacts to your environment.

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