

Going beyond label practices to improve the safety of pesticide applications

David F. Anderson

When we talk about pesticide safety and improving pesticide safety, what we are really looking at are three areas:

- ▶ The applicator, because that is the person most exposed to the material. They are exposed to it day in and day out in the course of their job duties.
- ▶ The clients and the general public who trust us to apply pesticides in the safest manner possible.
- ▶ The environment, especially the natural systems that still exist in some of our urban and suburban and landscapes.

Applicator safety: The hazards to the applicator are really a combination of the amount of exposure and the toxicity of the material used. We can reduce exposure through good training, use of personal protective equipment (PPE) and careful application practices. We can reduce toxicity by doing our homework and selecting the least toxic materials that get the job done. We can use tools and equipment that are specifically designed to help minimize the exposure to the applicator.

Client and public safety: If you think about it, when our clients ask us to come out and inspect their property and look at their trees for pest or disease problems, they are not really asking us to come out and apply pesticides; they are asking us to come out and solve a problem and if that requires the use of a pesticide they are trusting us to apply materials that are appropriate and safe for their landscape, environment and family. There are 2,700 chemicals that California lists as hazardous, so there is no end to the possible



To facilitate staying close to the target, install a ball valve between the end of the hose and the gun or on the gun itself. This allows the applicator to cut down the volume, and effectively pressure, without going back to the truck.

problems that you could have, which means we have a lot of responsibility in terms of selecting materials.

Environmental protection: Take precautions to avoid drift or spills onto sensitive areas. A few areas that we service have streams that still support salmon populations. Where properties back up to a lake, stream or wetland, leave an untreated buffer zone to insure that material does not drift or wash into the sensitive area. Neighboring farms, orchards, vegetable gardens and schools should be protected with an untreated buffer zone as well.

Let's look at specifics

Pesticide Selection: With the number and variety of products available to us today, it is worth doing some research before you buy. Any time you add a new pesticide to your program it requires more training for the applicator, more secure

storage space, more record keeping (MSDS, labels, inventories) and container disposal. Each material you select should be considered carefully.

Primarily we want to use the least toxic material that will provide control but also need to consider the method of application, formulation and even the container size and design. For example, if you need to treat mature elms along a street to control elm leaf beetle, look at materials that can be trunk or soil injected as well as foliar options. Anyone who has foliar sprayed 100-foot-plus trees knows that some drift and over-spray is likely if not inevitable. Materials that can be trunk or soil injected are more concentrated, and in some cases more acutely toxic, but the reduced exposure to the applicator and the environment keep the hazard to a minimum.

Mixing and loading: This is the point at which the applicator has greatest exposure



Chemical induction systems are now available on some sprayers, further reducing applicator exposure.

to the concentrated material. Personal protective equipment as specified in the label is required and it's important to look at the process as well. When I started as an applicator 23 years ago we stood on a catwalk and poured material out of a 2.5 gallon jug into a measuring cup that was balanced on top of the round spray tank at about face level. The tip and pour service containers that are now available eliminate the need, in most cases, for a separate measuring cup and greatly reduce the chances of exposure and spills during the mixing process. We actually have shelves built in our spray trucks now that are sized to hold these containers.

Chemical induction systems are now available on some sprayers that further reduce applicator exposure. You open the lid on the induction tank, open a valve, and the tank floods with water that continually circulates. You pour in your materials, close the lid, open another valve and the slurry is inducted into the spray tank. The induction system combined with the tip and pour containers create a nearly "closed" mixing and measuring system.

Application techniques: We have a huge challenge as arborists. The "crop" that we are often called upon to protect can be over 100 feet tall. The fact that the trees are located in busy neighborhoods, along property lines and over children's play areas just adds to the challenge. Even with the availability of soil and trunk injection

methods and materials, foliar applications are still an important tool in plant health care. The first really tall tree I ever sprayed dripped for probably 10 minutes after the application. The area under and around the tree was soaked. My supervisor looked at me and said "you got really good coverage BUT every drop of material that hit the ground was wasted". Not only was that material wasted, it didn't belong anywhere but on the tree.

A few years ago, the Bartlett Tree Research Lab took a real world look at drift and drift management and came up with some key concepts. First of all you have to get as close as possible to the target – don't try to spray something from far away. Secondly, too much pressure means too much drift. Applicators have a tendency to run at higher pressures than are really required creating more drift and overspray.

My early experiences with spraying trees were pretty intuitive. When we came to a really big tree we would just crank up the pressure. This worked OK and gave us some additional height some of the time, but it also created a tremendous amount of fine mist that drifted wherever the wind wanted to take it.



Secondary containment – On the truck, use plastic basins to line the base of your storage box. This will help keep containers upright and contain any leaks.

The research done at the lab involved spraying large trees at night using lights that illuminated the spray columns. The effects of pressure and tip changes became very clear. Required heights could be achieved using lower pressures with larger tip sizes minimizing the mist and drift. The column produced by a #14 tip at 350 psi was higher than the column produced by a #12 tip at 400 psi.

In order to facilitate staying close to the target we now install a ball valve between



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Safety valves are typically located at the outlet of each tank, and in front of each hose reel. Zip-ties used to hold the valve in the open position can be slid back and the valve closed should the need arise.

the end of the hose and the gun or on the gun itself. This allows the applicator to cut down the volume, and effectively pressure, without going back to the truck. The applicator can treat a 50 foot tree, close down the ball valve and then treat small shrubs from close range with minimal drift or over-spray.

Drift management with wind: I am not going to tell you that all of our applicators carry wind gages, but they are useful for training people. Experienced pesticide applicators know right away when they get

out of the truck and feel that little breeze how much it will affect the spray column, or whether or not they are going to be able to do that job that day depending upon the type of application. Wind gages are handy for training and can show a new applicator just what a 5 mph wind can do to their spray column.

Spill prevention and response: Spill prevention is more than just carrying a spill kit on your truck. You need to be trained in how to prevent spills and prepared to clean up spills if they occur. Here, again, it is important to look at the process.

Applicators can prevent spills by not carrying open containers from the storage area to the truck. Open containers should never be raised above shoulder height during the mixing and loading process. Use a secondary containment system to capture any leaks in the storage facility and on the vehicle. Plastic containment pallets are an easy way to provide secondary containment for your storage shed. In some areas there are specific requirements for secondary containment capacity (i.e. 50 percent of the aggregate of all liquids stored). On the truck, use plastic basins to line the base of your storage box. This will help keep containers upright and contain any leaks.

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Keep the hose ends capped. Application equipment is becoming more versatile but also more complex. Multiple tanks, multiple hose reels and banks of control valves are now common on our application vehicles. Always keep a spray gun, fertilization wand or just a ball valve attached to the end of each hose. This prevents material in the hose from dripping all over your truck and it could prevent a major spill if the wrong valve(s) is left open.

Understand the importance of safety valves. Safety valves are different than control valves. Safety valves are typically located at the outlet of each tank, and in front of each hose reel. Should an accident or malfunction occur, these valves can be closed to stop material from spilling. Keep in mind the tank valves must remain open during normal operation or the pump will be damaged. Zip-ties can be used to hold

(not lock) the valve in the open position. The tie can be slid back and the valve closed should the need arise.

Avoid transporting large volumes of mixed material. One advantage of shifting toward an integrated pest management (IPM) approach to plant health care is that

it has allowed us to get away from transporting large volumes of mixed material. I always felt a little concerned driving down the road with 900 gallons of pesticide mixed up in the tank. My spill kit is going to be of limited value in a large volume spill situation. Now we are able to mix smaller amounts at the site of appli-

cation using the largest tank as a fresh water supply and one of the smaller tanks as a mix tank.

Carry a well designed spill kit. There are many types of spill kits available. A spill kit designed to pick up hydraulic oil won't be much help with a dilute pesticide spill. Training in the use of the spill kit is just as important as the kit itself. Applicators must be confident in their abilities to handle spills or the kit may not get put to use when it's needed.

Dave Anderson has worked as a climber, crew leader, production supervisor and an arborist representative for Bartlett Tree Experts. He is currently the western division safety and training coordinator for Bartlett Tree Experts. ⬆



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