

# Fogging for Effective Pest Management

When it comes to low-volume chemical application in the greenhouse, growers have a variety of options to choose from — from mist blowers to targeted low-volume sprayers.

By Kurt Becker



**Top:** Low-volume foggers use less water or carriers to apply insecticides, fungicides, disinfectants and fertilizers to greenhouse crops. **Bottom:** By creating billions of tiny spray droplets, ultra-low volume systems can treat large areas with less chemical solution. (Photos: Damm Corporation)

Coverage is everything. Even the most effective new pesticide is useless unless it connects with the insect or disease it has been designed to eradicate. There are many methods of chemical application available to our industry. From hydraulic sprayers to targeted low volume and ultra-low volume, each system has its benefits and its weaknesses. Each method has its place in the greenhouse.

With each method, however, better coverage generally results from the creation of smaller droplets. Smaller droplets cover more surface area, resulting in less runoff and, often, less solution needed to spray your greenhouse.

## What Is Low Volume?

Generally, growers think of low volume in terms of the benefits associated with this method of application. Typically, low-volume application reduces runoff, pesticide usage, labor and exposure, and increases efficiency. Most people are unfamiliar with the science behind the low-volume concept.

The term "low volume" does not refer to the amount of pesticide used, although reduced pesticide may result. Simply put, low volume means less solution volume. A low-volume sprayer uses less water or carrier to apply insecticides, fungicides, disinfectants and even fertilizers to greenhouse crops.

Low-volume machines have been designed to create small enough droplets that they can reduce the required amount of volume needed to provide excellent coverage. From gallons to the acre or even less, low-volume machines reduce the amount of solution needed by creating droplets so small that the number of droplets expands greatly, resulting in greater surface area covered.

The types of machines that employ these principles are varied. Not all of them create the finest droplets. There are advantages and disadvantages to such small droplets, and different benefits can be achieved by selecting specific particle sizes. Because of this, we divide low-volume application into two groups: targeted low volume and ultra-low volume.

## Targeted Low Volume

Targeted low-volume sprayers create droplets with an average diameter of 40-70  $\mu$  (microns). These droplets do not create a true fog, but

more of a mist. Because the droplets are larger, they are less affected by air patterns. They also settle faster, allowing for use in unenclosed areas. These characteristics make the droplets directable, or "targeted." Growers can direct these droplets to hot spots, making this type of equipment ideal for spot treatment or selective treatment of greenhouses.

With targeted low volume, a grower could spray a bench of impatiens but avoid the bench full of tomatoes that do not require the spray. Targeted low volume will generally require more solution than ultra-low volume because the droplets are not as small.

This method will require more labor than ultra-low volume because it is more like traditional hydraulic spraying. However, because it uses less water, it is faster than hydraulic spraying.

Sprayers in this category include high-pressure cold foggers, directed aerosol generators, rotary-disc atomizers, mist blowers and electrostatic systems.

## X%+ Do the Math

To understand this concept, you must understand the basic relationship of particle size to volume. Reducing the diameter of a droplet by 50 percent while keeping the volume constant will result in eight times more droplets. Reducing the diameter to 10 percent of the original size will result in 1,000 times more droplets. Reducing the diameter to 5 percent of the original size will result in 19,000 times more droplets.

For example, the volume contained in one 100  $\mu$  (micron) droplet of water will yield eight droplets of 50  $\mu$  in diameter. The same 100  $\mu$  droplet will yield 1,005 - 10  $\mu$  droplets or 19,000 - 5  $\mu$  droplets.

By reducing droplet size greatly, you can decrease the volume needed. This is true because you can cover the same or greater surface area with less volume as the number of droplets increase.

### **Ultra-Low Volume**

Ultra-low volume (ULV) is space treatment. With this type of equipment, the droplets are much smaller, usually less than 25 µ in diameter. Because of this small size, the droplets drift on air currents and spread out to fill the space. This is a true fog, often resulting in a slight haze in the greenhouse. Unlike targeted low volume, this method is not directable and requires an enclosed space for best results. Typically, the fog fills the greenhouse, contacting both flying insects and those on the plants.

Ultra-low volume is very efficient as it uses less water and fills the greenhouse without the applicator needing to walk down each aisle. Sprayers in this category include thermal foggers and ULV aerosol generators. Total-release pesticide cans also fit into this category.

With some ULV systems, the equipment is automatic, requiring an applicator only to mix the pesticide, place the unit and set a timer.

Other systems, thermal foggers, require an applicator to be present but reduce the application time and exposure greatly. The Damm pulsFOG can treat a 30- by 96-foot greenhouse from the doorway in several minutes. This same method can be used to quickly treat large areas as well. Many tomato greenhouses rely on

thermal foggers to treat zones often larger than several acres quickly and efficiently.

### **Improving Your Pest Management Strategy**

Whichever method you choose, targeted low volume, ultra-low volume or both, low-volume application can help significantly with your pest management strategy. A combination of machines is often best for maximizing your pest management ability. Certain pests are best controlled with certain methods. Different machines lend themselves to different logistical situations better than others. Often, a grower's first choice in equipment for one set for reasons may not be the best for other, often-unconsidered reasons.

Sometimes a stubborn pest may require a directed spray rather than a whole house treatment. In this instance, a cold fogger machine might be a choice over the ultra-low volume methods. Because of their forceful, directed spray, they are often better at reaching deep into heavy canopies. This is particularly true of many cut flower crops.

Another example: A grower with 15 to 20 Quonset greenhouses may be interested in automatic ultra-low volume systems because of the labor savings and elimination of exposure during application. After an examination of his

greenhouse layout, this method may rank below the thermal fogger for logistical reasons. An automatic application may seem ideal until you realize that you leave the fogger in the treatment area overnight. With 15 greenhouses, this may become impractical. The thermal fogger, on the other hand, can be run quickly. Fifteen greenhouses could be treated in less than 30 minutes.

In each situation, the grower would achieve the desired result — a treated greenhouse with little exposure and little labor — but the automatic machine would actually take more time than the thermal fogger.

Finally, low-volume chemical application is not a magic bullet. Like all pest management strategies and techniques, it requires knowledge, practice and common sense. With the right combination of equipment and technique, low-volume application can help you achieve great results. **GPN**

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