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By Kurt Becker

# Spray more efficiently

Low-volume application machines create droplets small enough to reduce volume and provide thorough coverage

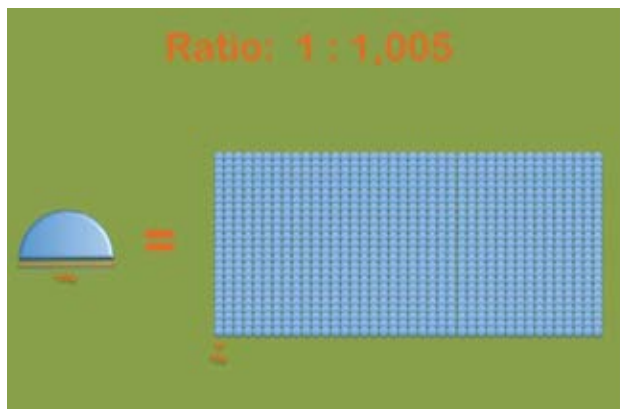
**W**hen applying pesticides, coverage is everything. Even the most effective new pesticide or fungicide is useless unless it comes in contact with the insect or disease it has been formulated to control.

There are numerous methods of chemical applications available to greenhouse growers. 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.

Better plant coverage generally results from the creation of smaller droplets. Smaller droplets cover more surface area, result in less run-off and can result in less product needing to be applied.

$$1 = 8 = 1,005 = 19,000$$

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



By greatly reducing the droplet size, the amount of volume can be decreased. The same or greater surface area can be covered with less volume as the number of droplets increase.

## Low-volume applications

Growers tend to think of low volume in terms of benefits associated with this method of application. Typically, low volume application increases efficiency and reduces run-off, amount of solution applied, labor and exposure to the chemical.

The term “low volume” does not refer to the amount of pesticide used, although reduced pesticide use may result. Low volume means less solution volume. A low-volume sprayer uses less water to apply chemicals and fertilizers.

Low-volume application machines have been designed to create droplets small enough that they can reduce the required amount of volume needed to provide thorough coverage. The droplets created are so small that the number of droplets expands greatly, resulting in greater surface area covered.

The types of application machines that employ these principles vary. Not all of them create the smallest droplets. There are advantages and disadvantages to such small droplets. Different benefits can be achieved by selecting specific particle sizes. Because of this, low volume

## Key Points

**1.** The term “low volume” does not refer to the amount of pesticide used, although reduced pesticide use may result. Low volume means less solution volume.

**2.** Targeted low volume sprayers create droplets that are not a true fog, but more of a mist. Because the droplets are larger, they can be directed to hot spots making this type of equipment ideal for spot treatment or selective treatment in greenhouses.

**3.** Ultra-low volume equipment creates much smaller droplets that are a true fog. Ultra-low volume is very efficient as it uses little water and fills the greenhouse without the applicator needing to walk down each aisle.

application is divided into two groups: targeted low volume and ultra-low volume.

### Targeted low volume

Targeted low-volume sprayers create droplets with an average diameter of between 40–70 microns. These droplets do not create a true fog, but more of a mist. Because the droplets are

larger, they are less affected by wind and air patterns. They also settle faster allowing for use in unenclosed areas. These characteristics enable the droplets to be directed or “targeted.” Growers can direct these droplets to hot spots making this type of equipment ideal for spot treatment or selective treatment in greenhouses.

Larger droplet size, in this instance, is relative. Targeted low-volume sprays are much finer than standard hydraulic sprays, although the equipment may be quite similar. Hydraulic sprays generally yield a droplet size that averages greater than 600 microns. Targeted low-volume sprays retain all of the benefits of low volume, but with more flexibility.

With targeted low-volume sprays, a grower could treat a crop on one bench, but avoid an adjacent bench with another crop that doesn't require treatment. Targeted low volume generally requires more solution than ultra-low volume as the droplets are not as small.

Targeted low volume requires more labor than ultra-low volume because it is more like traditional hydraulic spraying. However, because targeted low volume uses less water, it is often faster than hydraulic spraying.

Sprayers in the targeted low volume application category include high-pressure Coldfoggers, directed aerosol generators, rotary-disc atomizers, mist blowers and electrostatic systems.

### Ultra-low volume

Ultra-low volume (ULV) is space treatment. With this type of equipment the droplets are much smaller, usually less than 25 microns in diameter. Because of this small size, the droplets drift on air currents and spread out to fill the space. This is a true



TOP: Because of a Coldfogger's forceful, directed spray, it is often better at reaching deep into heavy plant canopies.

RIGHT: This ultra low volume applicator creates billions of tiny particles, 5 micron (μ) average diameter, that completely fill the treatment area and cover all surfaces.



fog, often resulting in a slight haze in the greenhouse.

This method is not able to be directed or targeted and requires an enclosed space for best results. Ultra-low volume is very efficient as it uses little water and fills the greenhouse without the applicator needing to walk down each aisle. Typically for pest control applications, the fog fills a greenhouse contacting both flying insects and those located on the plants.

Sprayers in this category include thermal foggers and ultra-low volume aerosol generators. Total release pesticides are also included in this category.

With some ultra-low volume systems, the equipment is auto-

matic, requiring an applicator only to mix the pesticide, place the unit in the greenhouse and set a timer. Thermal foggers, require an applicator to be present, but greatly reduce the application time and exposure. The Dramm pulsFOG can treat a 30- x 96-foot greenhouse from a doorway in several minutes. This same method can be used to quickly treat large areas as well.

### Combining systems

A combination of machines is often best for maximizing pest and disease management. Flying insects are very effectively controlled with ultra-low volume equipment such as thermal foggers or

automatic aerosol generators as the fog hangs in the air during application. However, spider mites on arching roses are particularly difficult to reach with an automatic, aerosol generator. Targeted equipment with a great deal of velocity or a thermal fogger that can be directed will do a better job.

Sometimes a stubborn pest may require a directed spray rather than a whole house treatment. In this instance, the Coldfogger style machine might be a better choice over an ultra-low volume application. Because of the Coldfogger's forceful, directed spray, it is often better at reaching deep into heavy plant canopies. This is particularly true of many cut flower crops.

A grower with 15 to 20 Quonset greenhouses may be interested in the automatic ultra-low volume system because of the labor savings and the elimination of exposure during application. After an examination of the greenhouse layout, this method may rank below a thermal fogger for logistical reasons. Automatic application may seem ideal. But if a fogger has to be left in the treatment area overnight, this may prove to be impractical with 15 greenhouses. A thermal fogger can be run quickly. The 15 greenhouses could be treated in less than 30 minutes. In each of these situations, the grower would achieve the desired result—a treated greenhouse with little exposure and little labor. But the automatic machine would take more time than the thermal fogger.

Low volume application, like all pest management strategies and techniques, requires knowledge, practice and common sense. GM

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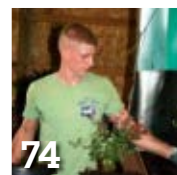
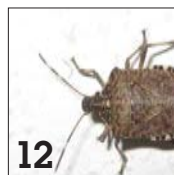
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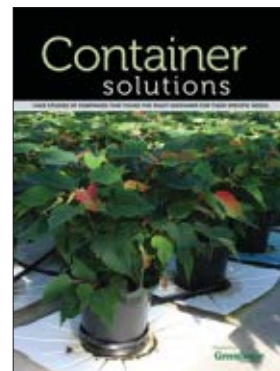
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