



THE PULSE AGRONOMY NETWORK  
PARTNERSHIP WITH INDUSTRY

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## *Making Nozzles Work*

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How can applicators get the most out of their pesticide application? The market is currently full of a wide variety of nozzles, and identifying the right one can seem overwhelming. The good news is that all nozzles currently available are of high quality and can be recommended. The bad news is that there are plenty of ways to use a nozzle improperly. Here are four rules to help in the process.

- **1. Choose the best *nozzle type* for your needs**

Ten years ago, two major nozzle manufacturers (TeeJet and Wilger) shared over 90% of the western Canadian market, manufacturing primarily conventional flat fan nozzles. Today, we have six large players (TeeJet, Wilger, Greenleaf, Hypro, Albuz, Air Bubble Jet,) and several smaller ones (Hardi, Sprays International, Lechler, Delavan), each of whom have extensive and good quality product lines. Luckily, most ag nozzles fall into one of four categories:

***Conventional Flat Fan***

Advantages: reliable performance, allows lowest water volumes  
Disadvantages: drift prone, can't use high pressures (due to drift)

***Pre-Orifice***

Advantages: reduce drift 50%, reliable efficacy at lower volumes, good for grassy weeds  
Disadvantages: Need slightly higher pressures than conventional flat fan (minimum 30 psi)

***Low-Pressure Air Induced***

Advantages: reduce drift 50 to 70%, can use reasonable pressure, good for grassy weeds at higher pressures or volumes  
Disadvantages: Need >5 gpa, minimum >30 to 40 psi

***High Pressure Air Induced***

Advantages: reduce drift 70 to 90%, good canopy penetration  
Disadvantages: Must use higher pressures (>60 psi) and more water (>7 gpa) for grassy weeds

Choose a nozzle type that meets your application goals and capabilities. This may mean you use three different nozzles over the course of a season, for example a pre-orifice nozzle for pre-seed burnoff at 4 gpa, a low-pressure air-induced for in-crop herbicides at 7 gpa, and a high pressure air-induced for fungicides or desiccation at 12 gpa.

- **2. Watch your water volume**

The coarser your spray, the higher your water volume must be. There are two main reasons for this. (i) you must have enough droplets per square centimetre to hit your target. This is most critical for pre-seed burnoff, where weeds are smallest, and low-volume, coarse sprays will likely miss weeds

entirely. (ii) you need sufficient coverage on your target for the pesticide to do its job. This is most important for contact herbicides such as bromoxynil, glufosinate, and reglone, and for insecticides and protective fungicides. It is also important for grassy weeds, most of which have a hard time retaining very large droplets. Once you have sufficient coverage, increasing coverage further usually doesn't help efficacy.

- **3. Use the right pressure for your nozzle**

The most common reason for performance complaints is when the spray pressure of a low-drift nozzle was too low, resulting in insufficient overlap between nozzles (see next point). Air-induced nozzles require higher pressures to operate properly. If your sprayer cannot produce sufficiently high pressures, you should not be using these nozzles. Try to do most of your spraying at these pressures: conventional, 20 to 50 psi, pre-orifice, 30 to 60 psi, low-pressure air-induced, 40 to 60 psi, high pressure air-induced, 60 to 80 psi. Higher pressures increase drift, but less so for air-induced nozzles. In most cases, an air induced nozzle at high pressure will drift considerably less than a conventional nozzle at low pressure.

- **4. Ensure good patterns**

With fine sprays from conventional nozzles, pattern uniformity is less important than for coarser sprays. This is because fine sprays can re-distribute themselves with wind or turbulence, covering up mistakes. On the other hand, coarser droplets produced by low-drift sprays will go where they're pointed, and they won't move easily from their path with wind or turbulence. There is only one chance to get uniform coverage across the boom. For coarse sprays, try to achieve a nozzle pattern width that is twice your nozzle spacing at the target height. Do this by selecting wider angle nozzles, increasing pressure, or adjusting boom height. This will ensure that the coarsest droplets at the pattern edge are mixed in with the more abundant, finer droplets found in the middle of a pattern.

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