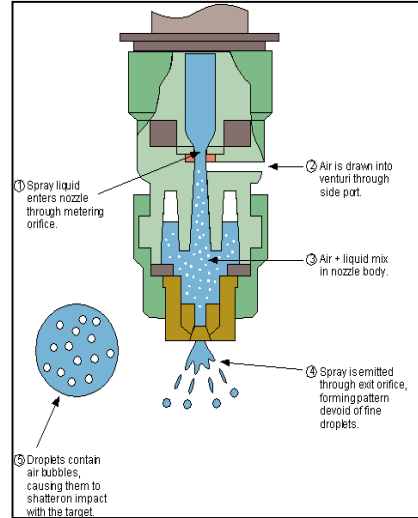


Four Rules of Nozzle Selection

Thomas M. Wolf
 Agriculture and Agri-Food Canada, Saskatoon Research Centre
 Tom.Wolf@agr.gc.ca (306) 956-7635

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

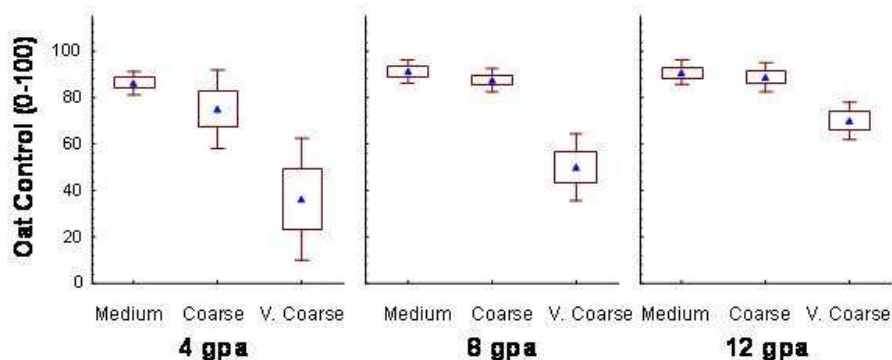
- a. **Conventional Flat Fan**
 - ▶ Advantages: reliable performance, allows lowest water volumes
 - ▶ Disadvantages: drift prone, can't use high pressures
- b. **Pre-Orifice**
 - ▶ Advantages: reduce drift 50%, reliable efficacy at lower volumes, wide pressure range, good for grassy weeds
 - ▶ Disadvantages: Need slightly higher pressures than conventional flat fan
- c. **Low-Pressure Air Induced**
 - ▶ Advantages: reduce drift 50 to 70%, can use reasonable pressure, wide pressure range, good performance for all applications
 - ▶ Disadvantages: Need >5 gpa, >30 to 40 psi
- d. **High Pressure Air Induced**
 - ▶ Advantages: reduce drift 70 to 90%, good performance for broadleaf weeds
 - ▶ Disadvantages: Must use higher pressures (>60 psi) and more water (>7 gpa) for grassy weeds



Determine your priorities before choosing a nozzle: Better drift control? (b,c,d). Best pressure range? (b,c). Very low water volumes? (a, b). All nozzles will give very good results provided you use them properly (see below). Coarse sprays are proven to work with almost all herbicides and fungicides.

2. Match water volume to spray quality and crop canopy

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 diquat, and for insecticides and protective fungicides. It is also important for grassy weeds, most of which have a hard time retaining very large droplets. Use at least 5 to 7 gpa for in-crop herbicides, 10 to 12 gpa for fungicides. The taller your crop canopy, the more water is required.



3. Know and use the right pressure for your nozzle

Even a good nozzle won't work well at the wrong pressure. Air-induced nozzles and some pre-orifice nozzles require higher pressures to operate properly. The most common reason for performance complaints is when the spray pressure of a low-drift nozzle is too low, resulting in poor spray distribution between nozzles (see next point). 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 – 50 psi, pre-orifice, 30 – 60 psi, low-pressure air-induced, 40 to 60 psi, high pressure air-induced, 60 to 80 psi. Higher pressures increase drift potential, but less so for pre-orifice and air-induced nozzles.



4. Ensure good patterns

Whereas finer sprays from conventional nozzles can re-distribute themselves with wind or turbulence, covering up poor patterns, the coarser droplets produced by low-drift sprays will go where they're pointed. Therefore, 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.

