Aerial Application and Nozzle Selection

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Selection of spray nozzles is critical to achieve proper application of agricultural herbicides. Adequate coverage for efficacy is required but this must be combined with proper parameters to minimize off target movement of the product.

Before selecting nozzles, consideration needs to be given to regulatory requirements, label requirements, droplet sizes and their driftibility, and interaction with active ingredients and adjuvants. Also, boom type and placement on the aircraft is important and must be considered.

Booms should be 70% to 75% of the wing span. This minimizes wing tip vortices which lead to drift. Booms also should be placed at least 10 to 16 inches below the trailing edge of the wing. This keeps the nozzles in "clean" air and away from turbulence which can cause droplet break up and thus smaller droplets that are more prone to drift. On rotary winged aircraft, the percentage of boom length compared to the rotor is similar to fixed wing but the booms are almost always more than 16 inches below the rotors. Also, booms that are streamline or airfoil types are preferable over round booms because there is less air turbulence around the boom. On helicopters, round booms are perfectly acceptable because of their placement in relation to the rotor.

Most nozzles are flat fan, T Jet disc core types, or CP. All are good and perform adequately when properly placed on the boom.

Various tables and software spread sheets may be used when selecting nozzles. These give indications of droplet sizes, droplet ranges, driftibility, and other parameters. Once a nozzle type and orifice size has been selected using these tools, the selection needs to be confirmed. This is necessary to ensure proper droplet size for efficacy, label language, and regulatory requirements.

Confirmation is achieved by using water and spraying over water sensitive cards. These are then analyzed for VMD, Vd. 0.1, Vd. 0.9, and percent of spray volume less than 200 microns. If parameters are not met that reduce drift, minimize drift, or meet other required parameters, then adjustments may be made to deflection angle, pressure, airspeed, orifice size, or a combination of these. The aircraft is then retested.