

**THE INFLUENCE OF NOZZLE TYPE ON THE CONTROL OF FIELD CROP WEEDS.
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ABSTRACT

This study was conducted to evaluate herbicide efficacy comparing multiple nozzle types designed to reduce drift while maintaining adequate efficacy. The experiment included comparisons of a chamber style nozzle, the turbo flat-fan from Spraying Systems (TT); three older venturi styles, the AirMix from Greenleaf (AM), the Ultra LoDrift from Hypro (ULD), and the Air Induction from TeeJet (AI); two new venturi style nozzles, the Air Induction Extended Range from TeeJet (AIXR) and the Guardian from Hypro (GA); a new design chamber nozzle, the Turbo Twin flat-fan from TeeJet (TTJ60), and a new venturi design from Greenleaf, a TurboDrop High Speed Twin Fan (TD HS TF). Orifice sizes and operating pressures for each nozzle treatment were selected to deliver a spray volume of 70 L/ha at 16 km/h. Droplet size was determined based on nozzle type and pressure selected for each nozzle from manufacturer recommendations. The flow rates were attained by selecting the following orifice sizes: TT110025, AM110025, TTJ60110025, GA110025, AIXR110025 (all at 276 kPa), AIC11002, ULD12002, and TDHSTF11002 (all at 483 kPa). Applications were made with a tractor-mounted 3-point sprayer equipped with a 4-nozzles spaced at 51 cm and located 51 cm above the target. Glyphosate at 0.42 kg ae/ha and paraquat at 0.42 kg ai/ha were used to compare efficacy on velvetleaf, common sunflower, sorghum, and corn. Ammonium sulfate at 2% w/w was added to the glyphosate treatments and nonionic surfactant at 0.5% v/v was added to the paraquat treatments. Treatments were replicated three times and efficacy was evaluated 28 days after treatment.

Species control varied between glyphosate and paraquat. When averaged across nozzle type and species, glyphosate had 97.9% control and paraquat had 80.2% control. Glyphosate had very few differences in control among nozzle types. Range of control averaged across nozzle type by species was 99.8% for corn, 99.6% for sorghum, 98.4% for common sunflower, and 86.8% for velvetleaf. Velvetleaf control across nozzle type ranged from 88 to 82% with the TT significantly less compared to the other nozzle types. In corn, the range in control was 100 to 99% with the AI significantly less. In common sunflower the TT and AM were significantly less than the other types with range from 100 to 97%. There were no significant differences found in control of sorghum among nozzle types. With paraquat, differences were found across all nozzle types and species. Range of control averaged across nozzle type by species was 93% for common sunflower, 83.5% for corn, 73.3% for velvetleaf, and 71.0% for sorghum. The AM and the TTJ60 were significantly less for velvetleaf control. The TT was significantly better than the others for sorghum control. The TTJ60 had significantly less coverage with sorghum. The TT, AM, GA, and TDHSTF were significantly better for control of corn, while the GA was significantly lower in control of common sunflower.

There were no significant differences found for each species among nozzle types when averaged across glyphosate and paraquat. Average control across nozzle type was 96% for common sunflower, 92% for corn, 85% for sorghum, and 80% for velvetleaf.