

# Liquid manure injection systems: Performance evaluation

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The past decade has seen a steady increase in the number of acres receiving liquid hog manure in Alberta. Manure injection offers a number of advantages over broadcasting including minimized odour, placement of nutrients into the seedbed, and minimal nutrient loss. As the number of manure applicators practicing injection increases, knowledge of the expected performance of various injectors needs to be established.

Two low disturbance injectors (K-Hart and Yetter), two high disturbance injectors (Spike and Sweep), and an aerator (Aerway) were assessed for liquid placement, soil disturbance, and crop residue disturbance at rates ranging from 34000 to 146000 L/ha (3000 to 13000 gal/ac) and ground speeds ranging from 2.6 to 10.6 km/h (1.6 to 6.6 mi/h). Each system was also assessed for odour control at 67000 L/ha (6000 gal/ac) at 0, 4, and 24 h after injection. Draft tests were also performed for each injector with the exception of the Aerway at depths ranging from 8 to 15 cm (3 to 6 in).

All injectors provided acceptable liquid placement at all rates with the exception of the K-Hart, which placed liquid outside the furrows at rates above 79000 L/ha (7000 gal/ac), and the Aerway, which placed liquid on the field surface at all rates. Liquid placed within the furrow absorbed into the surrounding soil and followed fracture lines created by soil-tool interaction. The K-Hart, Yetter, and Aerway produced soil disturbance less than the 30% low disturbance guideline while the Spike and the Sweep produced soil disturbance in excess of 30%. Similar results were observed for crop residue disturbance. Immediately after injection, the Aerway produced the most odour while the Spike produced the least. With the exception of the Spike, odour from all injector treatments diminished significantly from 0 to 4 h and from 4 to 24 h after injection. Odour produced by all injector treatments at 4 and 24 h after injection was below detectable limits for the majority of the population. The high disturbance injectors required more draft than the low disturbance injectors at all depths.