

ENVIRONMENT

Title: Evaluating land waste application machinery to meet odor and environmental objectives
NPPC #97-1851

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Abstract:

Field experiments in no-till soybean and corn residue were conducted to evaluate six liquid swine manure application methods. The methods were: injection with a conventional 1) knife or 2) sweep, 3) incorporation with tandem disk after broadcast application, 4) broadcast application, 5) injection with a narrow-profile knife, and 6) surface application behind row cleaners. The row cleaner and all injection treatments used finger-closing wheels. Air samples over the soil surface were obtained during and after application and residue cover and yield were measured. Odor level was measured by the amount of air dilutions to reach odor threshold. Placement of material into the soil was evaluated with dye.

Incorporation techniques typically reduced odor level by a factor of three to ten as compared to a broadcast application. A day after application, odor was greatly reduced and often indistinguishable from that of untreated soil. Differences among application methods were more pronounced in soybean residue. Application by the narrow-profile knife, row cleaner, and conventional knife maintained soybean residue cover better than other incorporation methods and limited odor similar to these methods. Although cover is reduced over winter, greater soybean residue cover remains after planting with fall than spring applications. Differences among methods in odor level and residue cover were less in corn. All incorporation techniques reduced odor levels and knife incorporation maintained corn residue cover after planting similar to broadcast application. For both crops, broadcast application maintained the greatest residue cover, but had the highest odor level. Material was incorporated five to seven inches deep by the knife, sweep, and narrow knife; two to three inches deep by the tandem disk and row cleaner; and at the surface by broadcast application. Corn yield was generally greater for spring application by incorporated treatments.

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