WISCONSIN - Low-Disturbance Manure Application Reduces Runoff, Maintains Residue Cover

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Manure applied to cropland is a source of phosphorus and nitrogen in surface runoff and can contribute to impairment of surface waters. Immediate tillage incorporates manure into the soil, reducing nutrient loss in runoff, as well as nitrogen loss via ammonia volatilization. But tillage also incorporates crop residue, which may increase erosion potential. As part of a multi-year study that is still in progress, we measured the nutrient runoff losses and residue cover with two low-disturbance and two conventional manure application procedures: low-disturbance sweep injection with paired disks that create a ridge for planting in the spring (strip-till); tine aerator-band manure application, which applies bands of manure over aerator slots to encourage manure infiltration; standard broadcast application incorporated with a disk; and standard broadcast application left on the surface. We applied liquid dairy manure in a silage corn-rye cover crop system in late October and used a portable rain simulator two or more days after application to generate runoff.

Preliminary results show the highest runoff losses of total and dissolved phosphorus from surface-applied manure, as would be expected. Total phosphorus loss was reduced by approximately 35% by the aerator band method, 70% by disk incorporation, and almost 90% by strip-till injection, which was not statistically different from the control treatment that received no manure. In addition, the low-disturbance methods maintained residue cover better than disk incorporation of manure.