

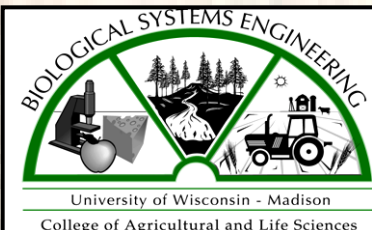
Liquid Manure in Tile Drains: Pathways and Risk Reduction Strategies

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***WI Crop Management
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Overview

- ✓ Places manure should and should not be.
- ✓ How liquid manure gets into tiles.
- ✓ Reducing the risk of manure entering tiles during application.
- ✓ Summary and conclusions

Places manure should be

Manure is a fertilizer resource providing:

- Nutrients (N and P) essential for good crop yields.
- Organic matter essential for good soil health.



*Places manure should **NOT** be*

DNR probes fish kill

By Associated Press

Posted: Dec. 2, 2009

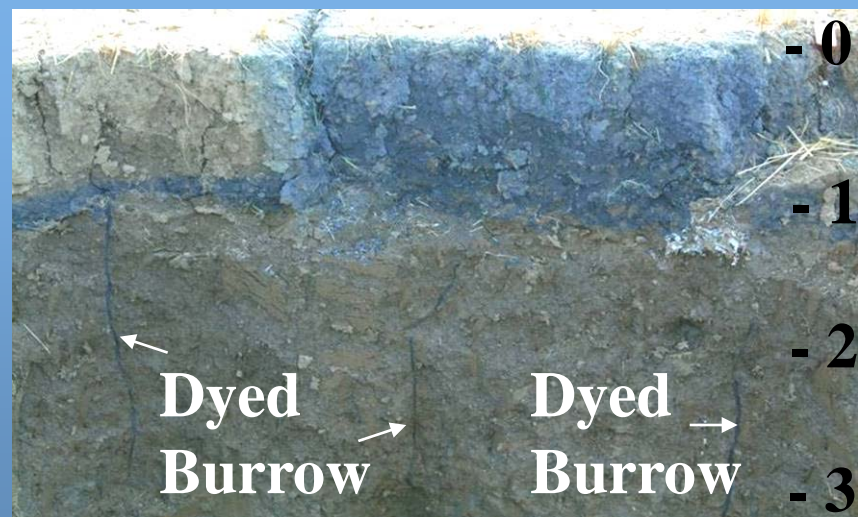
The state Department of Natural Resources is trying to find out what caused the death of as many as 2,000 fish on a trout stream near **your farm**, Wisconsin.



Soil Macropores

Leaching via preferential flow pathways

- Biopores
- Structural cracks



Surface Inlets and Blowouts



Blowouts



Surface Inlets

Maryland Plot Study

✓ **Tillage system**

- No till

✓ **Cropping System**

- Corn - soybean rotation

✓ **Soil types**

- Silt Loam
- Silty clay loam

✓ **Source of P**

- Soil (high P at surface)
- Swine manure (1% solids)

✓ **Method of Application**

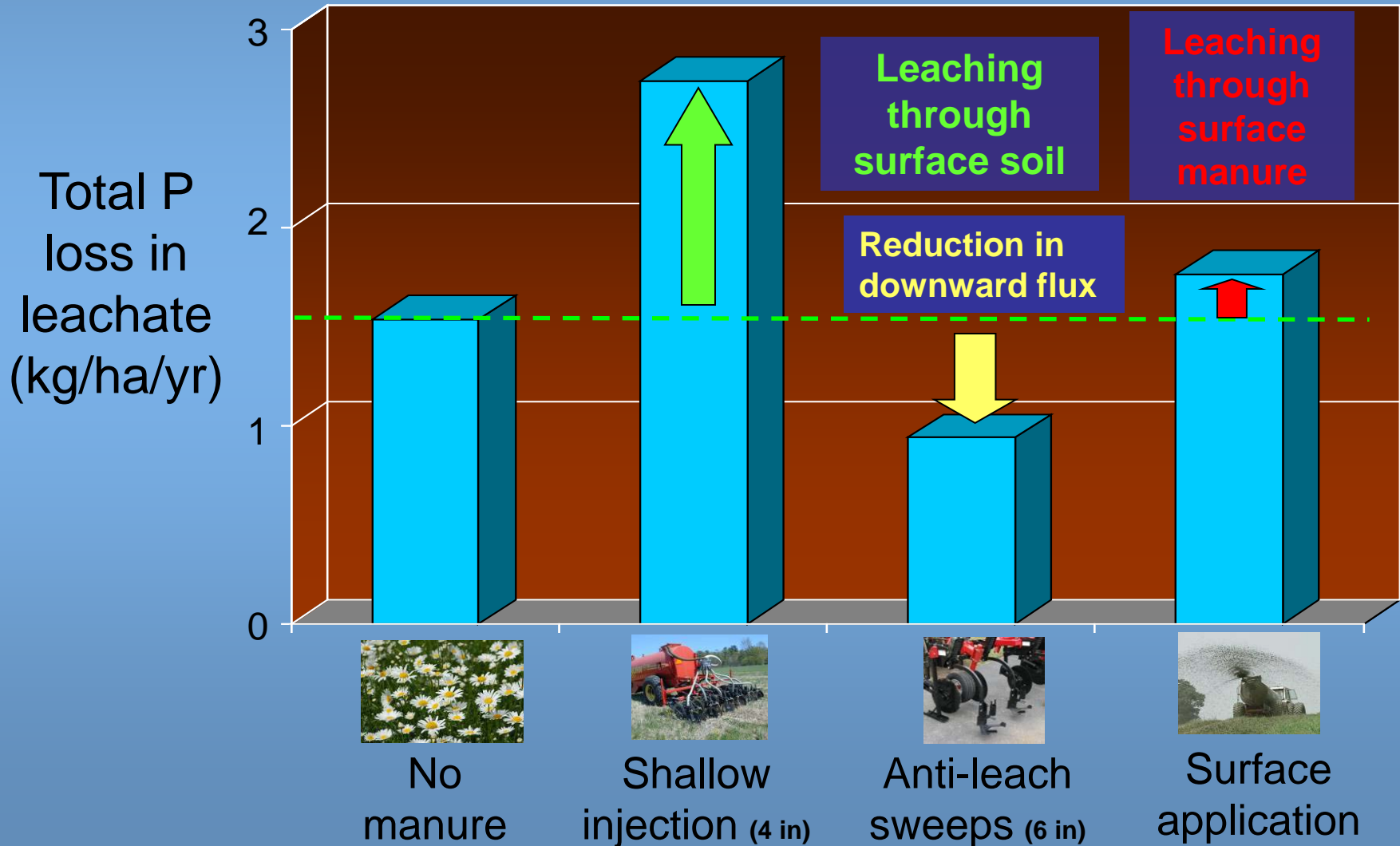
- DSI sweep injection
- Shallow disk injection
- Surface broadcast

✓ **Rate of P**

- Control, 0 lbs/ac P_2O_5
- 100 lbs/ac P_2O_5
 - 6000-8000 gal/ac

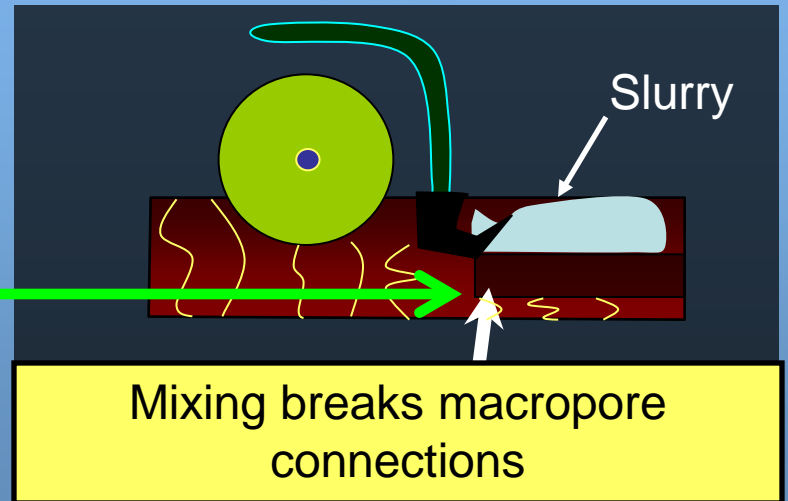
Tillage and Leaching Losses

(First year preliminary results !!)



Dietrich “anti-leach” sweeps

(under development, patent pending)



Dietrich “anti-leach” sweeps

Aeration Type Applicator



AerWay SSD manure management system

Aerator tines create soil pockets that retain manure allowing liquid to infiltrate.



Tines aligned with travel direction



Tines at 10° to travel direction

Aeration Applicator Research

1. Field experiments were carried out in spring and fall 2003 and spring 2004 at the University of Western Ontario.
2. The tile drain depth was ~ 3 feet on fallow fields with a bio-solids application rate 9,350 gal / ac.
3. *The AerWay SSD system, did not cause measurable changes in tile drain discharge during any study period condition.*

Conclusions

- ✓ *Avoid unincorporated surface manure applications in areas drained by tile surface inlets.*
 - *Consider replacing the surface inlet with subsurface tile or using injection.*
- ✓ *Repair tile “blowouts” and / or make system design changes to keep blowouts from reoccurring.*

Conclusions

- ✓ *Anti-leaching sweeps reduced P loss through subsurface drain tile compared shallow injection and surface application.*
- ✓ *The AerWay SSD system significantly reduced manure flow into tile from surface applied manure.*
- ✓ ***When soils are wet, the risk of manure leaching and runoff increases significantly regardless of application method used.***