Manure Application on Tile-Drained Cropland

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Consider alternatives

• Land application
• Saturated buffers
• Fall cover crops
• Constructed wetlands
• Retention and re-use
  – Baker Lad’s Farm
  – Sub-irrigation
• Anaerobic digestion

Key points: Manure on drained land

• High risk soils are fine-textured soils.
• Sandy loams are lower risk.
• Problems are likely with:
  • high rates
  • wet ground
  • when tile lines are flowing
• Tillage breaks preferential flow paths
• Both tillage and low rates are needed
• Tile lines must be monitored
Soil is porous, soil systems leak

- Liquid manure can move to subsurface drains within minutes of application.
  - Earthworm holes
  - Soil cracks and macro-pores.
  - Root channels.
- Fine-textured soils are high risk
- Sandy loams are lower risk

Tillage

- Injected manure in no-till has appeared in tile drains within minutes
- No-till soils have more continuous flow channels than tilled soils
- Tillage disrupts macro-pores, delays manure movement and greatly decreases bacterial concentration in effluent

Tillage alone will not solve the problem
Must include low rates also
- Pre-till the soil
- Injectors with lots of tillage and mixing action
- Or drop manure behind rolling tines
- Close injector spacing with many tires is better
- Avoid old sweep-type injectors

6,000 gpa, aerated corn silage ground
The right amount of tillage?

The right amount of tillage is site-specific!
- Inhibit movement to subsurface drains.
- Prevent overland flow.
- Minimize odor.
- Distribute manure throughout the root zone.

Rates

High rates are a problem
- Less than 3,600 gpa on un-tilled ground (Ontario)
- Few problems with less than 6,000 gpa and pre-tillage
- Precipitation can give it a 'push'

Right Application Rate?

Dilute slurry is more flowable
- Agronomic rate?
  - soil test
  - manure nutrient content
  - crop requirements
- Agronomic rate will be too high with a dilute slurry
- Soil water holding capacity does not account for preferential flow paths
Timing

• When soil is dry and tiles are not running
  – Sidedress time
  – After harvest
• Do not apply when rain is expected
• Use tile blocks if needed

Recommended

• Use soil conservation practices to prevent overland flow
• Apply when the soil is dry and tiles not flowing
• Pre-tillage plus low rates
• Apply, observe, evaluate, adjust
• Monitor outlets
• Consider all alternatives
• Heavy rain can trump best intentions