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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

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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

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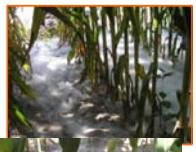
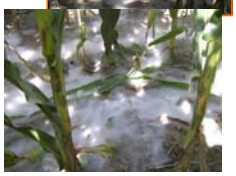
Soil is porous, soil systems leak

- 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





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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

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Tillage

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 tines is better
- Avoid old sweep-type injectors

6,000 gpa, aerated corn silage ground

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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.

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Rates

High rates are a problem

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

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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

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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

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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