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How uniform are water flow and pesticide transport in cultivated sandy soils?

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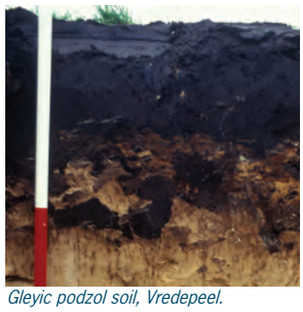
Introduction

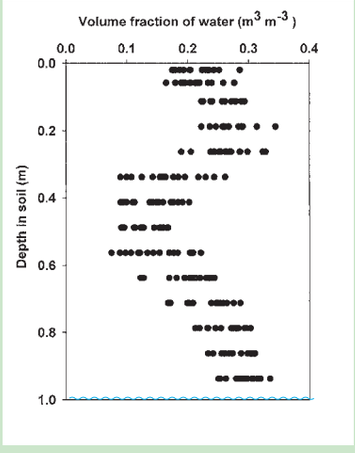
- Water flow and pesticide transport in cultivated sandy soils are often assumed to be rather uniform.
- However: various causes of non-uniform water flow in crop canopy, at soil surface and in soil profile.



Gleyic podzol soil, Vredepeel.

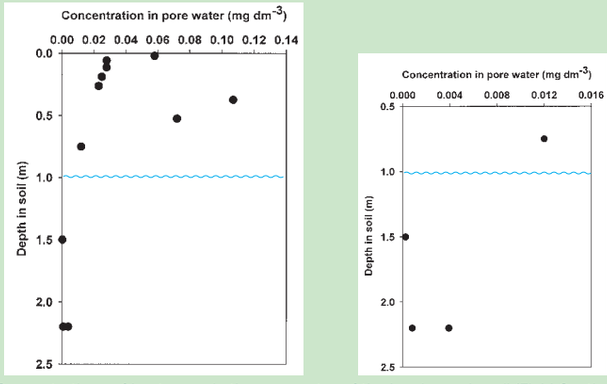
Wetting front.

Water flow in soil



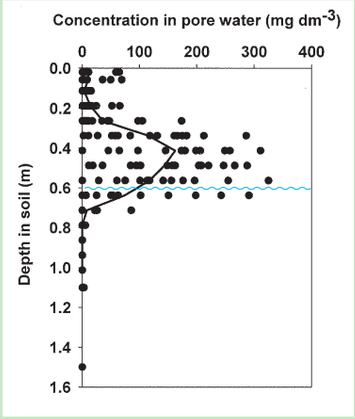
Volume fractions of water measured in the humic-sandy soil of the Vredepeel experimental field (14 Dec.) by coring at 16 places. Blue line = groundwater table

Transport of bentazone in soil



Concentrations of bentazone in the pore water of the humic-sandy soil (Field Section 1, Vredepeel; 5 March) at 103 days after application. To the right: enlarged concentration scale. Blue line = groundwater table

Transport of bromide ion in soil



Concentrations of bromide ion in the pore water of the humic-sandy soil (Vredepeel; 3 Jan.) at 42 days after application.
Black line = average of the concentrations per depth.
Blue line = groundwater table

Conclusions

- Heterogeneous water flow and pesticide transport in cultivated humic-sandy soil.
- Indications of preferential transport of pesticides.

Questions

- Is it possible to simulate such pesticide transport with the convection-dispersion approach? E.g. with a high value of the dispersion length.
- How suitable are the data sets for field conditions to discriminate between model concepts? E.g. convection-dispersion, mobile-stagnant domains, dual velocity domains.

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