In search of alternative herbicides to treat Swiss railway tracks

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Weed control on railway tracks

In addition to mechanical removal, hot-water treatments, installation of growth-inhibiting geotextiles and targeted greening ("green carpet“) to inhibit weed growth, **chemical treatments** are utilized to eliminate weeds on railway tracks.

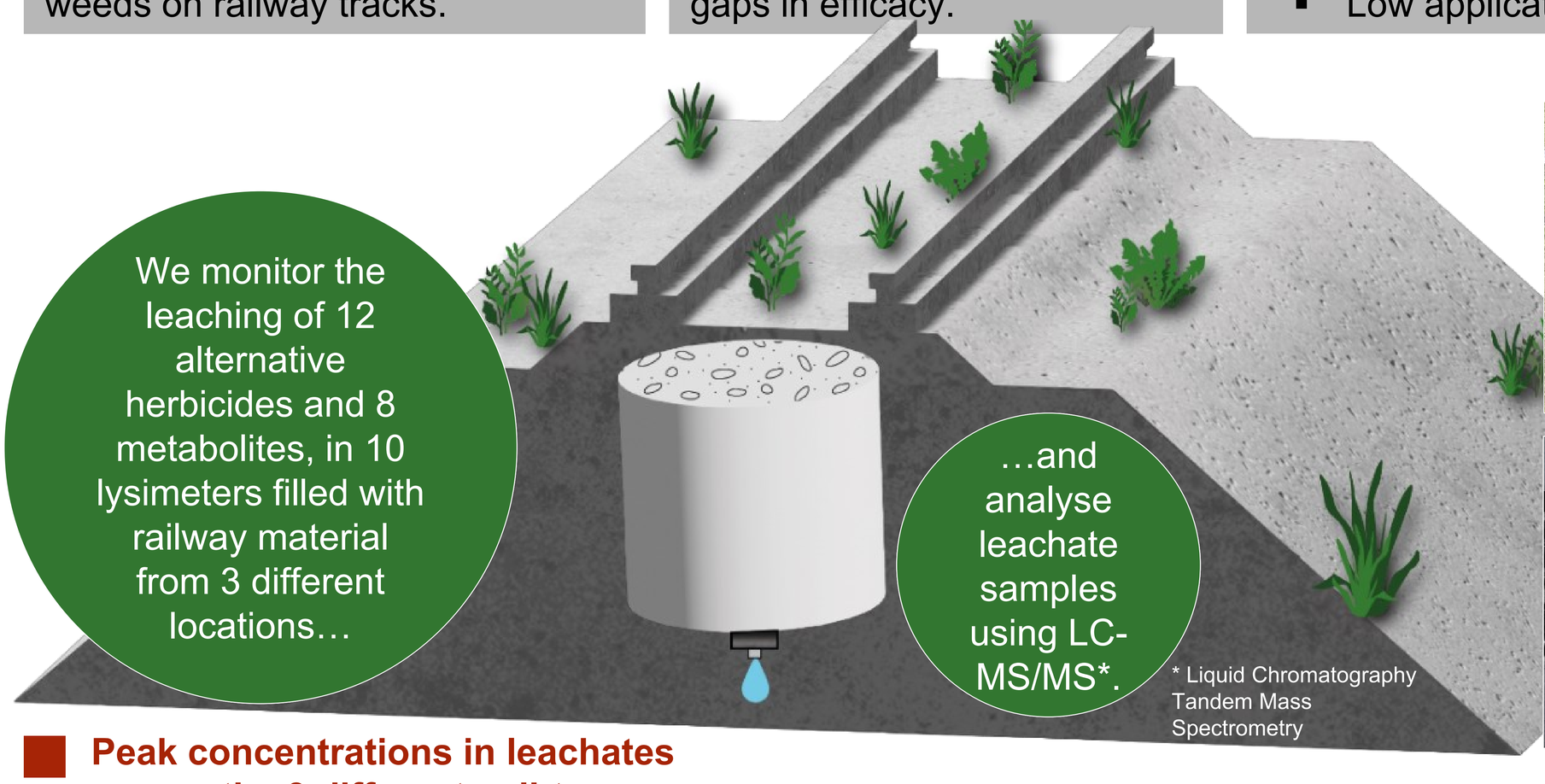
Current situation

Glyphosate is the only herbicide used by the Swiss Federal Railways. The railways are **searching for alternative herbicides**[1] that could replace it if its use is restricted or to fill gaps in efficacy.

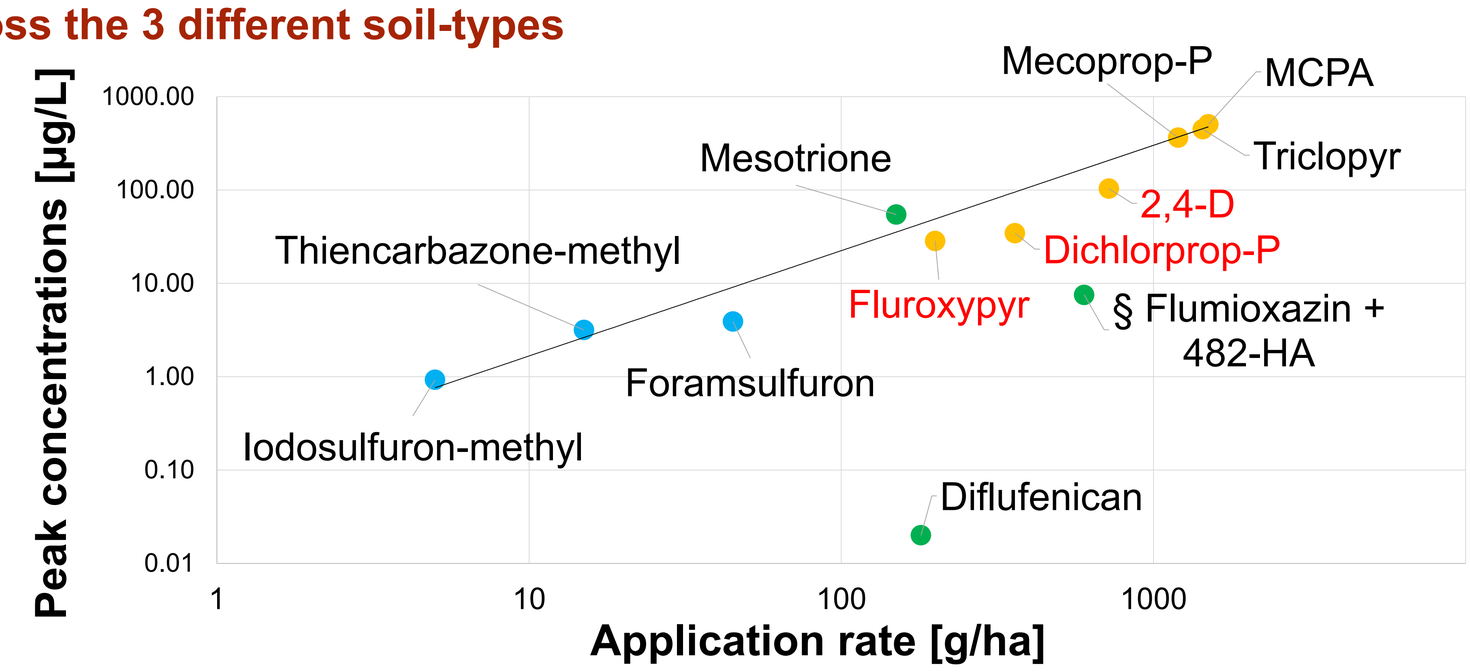
Characteristics of a suitable alternative herbicide with respect to groundwater contamination

Given the **strong draining potential** of railway tracks, alternative herbicides must meet specific criteria to ensure effective and safe use:

- High sorption in the soil.
- Rapid degradation (also for metabolites).
- Low application rates.



Peak concentrations in leachates across the 3 different soil-types



§ Flumioxazin and its metabolite 482-HA (as parent equivalent).

Results (one year after application)

- Peak concentrations of herbicides with high mobility correlate with the application rates.
- Overall, sulfonylureas have lower peak concentrations than auxins.
- Auxins applied as esters tend to show lower peak concentrations than the corresponding acids (i.e.,esters convert into acids).
- Metabolites (not shown) had lower peak concentrations than the active substances.
- The lipophilic herbicides **diflufenican** and **flumioxazin** display clearly lower peak concentrations.
- Even though **diflufenican** is not problematic with respect to groundwater contamination, an accumulation in the railway soil is possible due to its high persistence.

Acknowledgements

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Publication of the 1st set of alternative herbicides:

[1] Buerge, I. J., Kasteel, R., & Poiger, T. (2024). Leaching of herbicides and their metabolites in lysimeters filled with soils from railway tracks. *Science of the Total Environment*, *909*, 168396.

Link to the project webpage

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