Tracing the origin and mobilization of Glyphosate and AMPA in a vineyard catchment

Matthias Gassmann[1], Oliver Olsson[1], Sylvain Payraudeau[2], Gwenaël Imfeld[2], Klaus Kümmerer[1]

[1]Institute for Sustainable and Environmental Chemistry, Leuphana University of Lüneburg, Germany; [2] Laboratory of Hydrology and Geochemistry of Strasbourg (LHyGeS), University of Strasbourg/ENGEES, UMR 7517 CNRS, France

Problem

High concentrations of Glyphosate and AMPA in runoff of the Rouffach catchment:

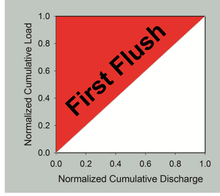
Year 2008	Max. event amount	Max. event concentrations
Glyphosate	0.17 g/ha	100 µg/l
AMPA	0.03 g/ha	6.7 µg/l

Where do the substances come from?

Methods for investigation of…

Sampling data

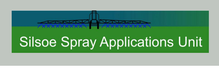
NCL-Method



Input function

Silsoe Field model

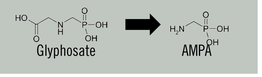
- ✓ Single nozzle
- ✓ 0.5 bar
- ✓ T_a = 9°C
- ✓ u=1-8 m/s



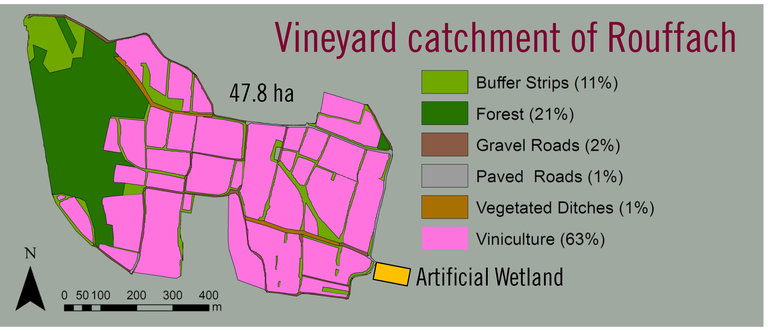
Environmental Fate

ZIN-AgriTra Model

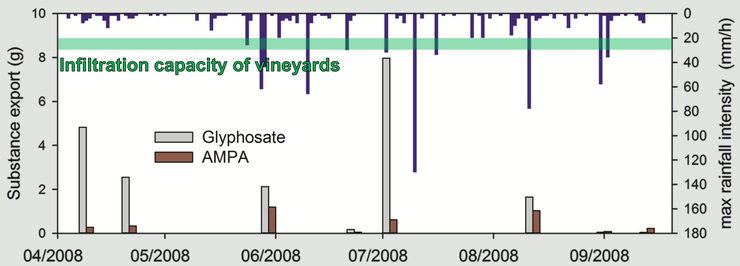
- ✓ Process-based
- ✓ Fully distributed
- ✓ Kinetic sorption
- ✓ Transformation

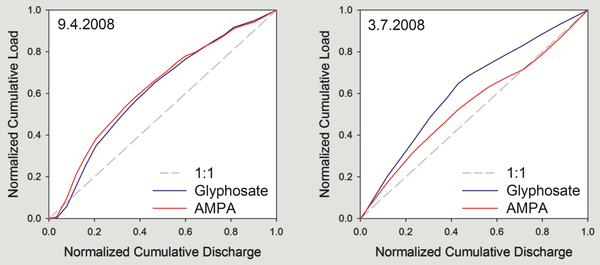


Vineyard catchment of Rouffach

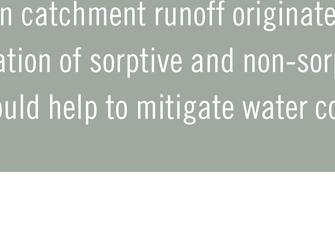


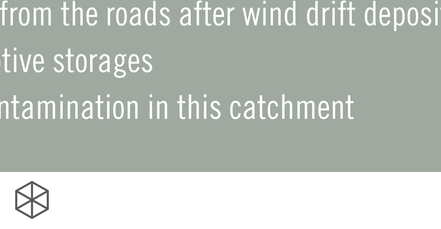
Sampling Data Analysis





Drift Modelling 2./3.4.2008





Results	Fraction	Amount
Sampled Glyphosate export 9.4.2008	0.11%	4.8 g
Sampled AMPA export 9.4.2008	0.01%	0.3 g
Calculated spray drift on roads	0.03-0.12%	1.5-5.6 g
Exp. spray drift for fungicide on roads[1]	0.1-0.6 %	-

[1]In the same catchment under similar wind conditions (Lefrancq et al., 2013)

Fate and Export Modelling 9.4.2008

Amounts	Glyphosate	AMPA
Sampled	4.8 g	0.3 g
Modelled 100% impervious	1.2-4.5 g	0.1-0.2 g
Modelled 35% impervious	1.2-4.5 g	0.1-0.2 g

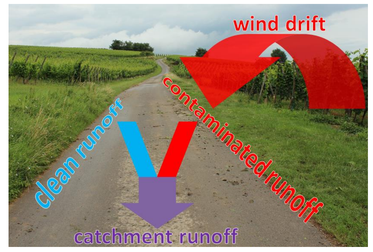
Contribution of impervious areas
First Flush behaviour

Drift on roads at high wind speeds is
in the range of export amounts

Drift explains large parts of export behaviour
Sorptive and non-sorptive substance storage

Conclusions

- ✓ Major parts of Glyphosate and AMPA in catchment runoff originate from the roads after wind drift deposition
- ✓ The mobilization process is a combination of sorptive and non-sorptive storages
- → Avoiding non-target pesticide drift could help to mitigate water contamination in this catchment



Contacts

Matthias Gassmann
Institute for Sustainable and Environmental Chemistry
Leuphana University of Lüneburg
phone. +49.4131.677-2943,
gassmann@leuphana.de

http://www.leuphana.de

PhytoRet Interreg IV

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