

# PENDIMETHALIN RUNOFF IN LIGHT AND HEAVY SOIL

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## • INTRODUCTION

- # Herbicides can have an adverse environmental impact because of drift, leaching and runoff;
- # Pendimethalin is a pre-emergence herbicide largely used to control most annual grasses and many broad-leaved weeds in several crops, and in maize in particular;
- # Contamination of water courses can be reduced by adopting untreated "buffer strips" at the edges of cultivated fields;
- # Soil characteristics (texture and OM content, in particular) can affect pesticide movement due to runoff

## • AIM To study the runoff of pendimethalin over two soils with different texture cultivated with maize

## • METHODS

Years: 2003 and 2004

Treated Area (146 m)  
Pendimethalin (1.5 kg a.i. ha<sup>-1</sup>) in pre-emergence

Untreated strip (6 m)

Sand %	52.2
Silt %	31.7
Clay %	16.1
pH	6.2
OM %	1.0

14 m

"Heavy soil"

Sand %	68.8
Silt %	26.8
Clay %	4.4
pH	7.6
OM %	1.5

14 m

"Light soil"

Slope 0.5%

A

Water collection and sampling

Top soil samplings 5 cm depth

position A: 10 m from untreated strip  
positions B-F: transects 1 m-spaced.  
(3 samples 5x5 cm / position)

Soil samplings at 0, 7, 14, 56, and 150 (2003 only) DAT

Water samplings after rain or irrigation: at 30, 51, 76, 89 DAT (2003); 61, 83, 98 DAT (2004)

LC analyses  
detection limit: 0.003 mg L<sup>-1</sup> (water)  
0.002 mg kg<sup>-1</sup> (soil)

## • RESULTS

### Pendimethalin in runoff water

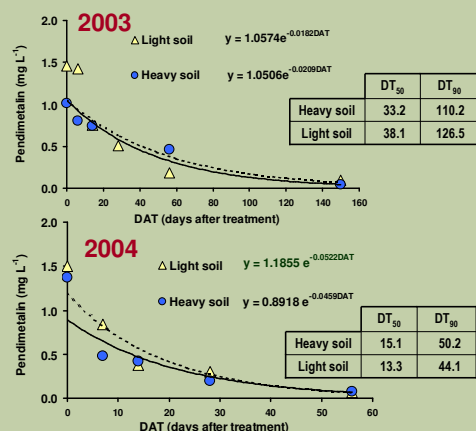
### No samples above the detection limit

- In keeping with data from the literature
- Long interval between treatment and first water collection (30 days, in 2003, and 61 days, in 2004)

### Pendimethalin in soil

#### Position A (Treated Area)

#### Positions B-F (Untreated Area)



2003	Heavy soil mg kg <sup>-1</sup>				
DAT	B	C	D	E	F
0	0.000	0.000	0.000	0.000	0.000
7	0.005	0.003	0.000	0.009	0.018
14	0.050	0.000	0.028	0.000	0.000
56	0.006	0.004	0.002	0.004	0.008
150	0.000	0.000	0.000	0.000	0.012

2003	Light soil mg kg <sup>-1</sup>				
DAT	B	C	D	E	F
0	0.000	0.000	0.000	0.000	0.000
7	0.027	0.003	0.008	0.010	0.001
14	0.000	0.000	0.000	0.000	0.000
56	0.000	0.000	0.000	0.000	0.000
150	0.027	0.000	0.000	0.000	0.000

2004	Heavy soil mg kg <sup>-1</sup>				
DAT	B	C	D	E	F
0	0.000	0.000	0.000	0.000	0.000
7	0.004	0.017	0.012	0.006	0.012
14	0.058	0.050	0.062	0.000	0.009
56	0.030	0.053	0.048	0.031	0.000

2004	Light soil mg kg <sup>-1</sup>				
DAT	B	C	D	E	F
0	0.000	0.000	0.000	0.000	0.000
7	0.031	0.015	0.000	0.000	0.000
14	0.007	0.011	0.000	0.000	0.000
56	0.015	0.018	0.000	0.000	0.000

## • CONCLUSIONS

No pendimethalin in runoff water

Untreated buffer strip of 6 m large is enough to prevent water courses contamination

Higher horizontal movement of pendimethalin in heavy soil

Higher presence of clay particles in runoff water on which pendimethalin could have been adsorbed

Need of larger untreated (buffer) strips in heavy soils