

# FATE OF PROPANIL AND 3- 4 DICHLORANILINE IN PADDY FIELDS

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## • INTRODUCTION

Propanil is a contact herbicide largely used in post emergence in rice fields in North Italy. It is rapidly degraded to 3-4 dichloraniline in both soil and water.

**The aim** of this study was to investigate the fate of propanil and 3-4 dichloraniline in three paddy fields in which different combinations of seeding systems, straw management crop and organic fertilisation (liquid manure) were compared

## • METHODS

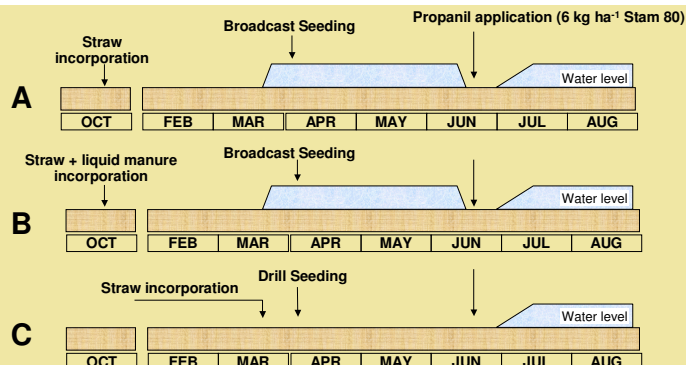
**Year 2004**

### Soil characteristics

	Depth (cm)		
	25	50	90
Sand %	43.3	44.8	52.5
Silt %	45.5	41.6	35.0
Clay %	11.2	13.6	12.5
pH	6.5	7.1	7.1
Organic Carbon %	0.9	0.3	0.2

### Sampling

- Soil solution with suction cups at 25, 50, 75, 100, 150 cm depth.
- Sediment (5 cm depth) in the paddy fields.
- Flooding water in the paddy fields.



### Propanil and 3-4 dichloraniline determination

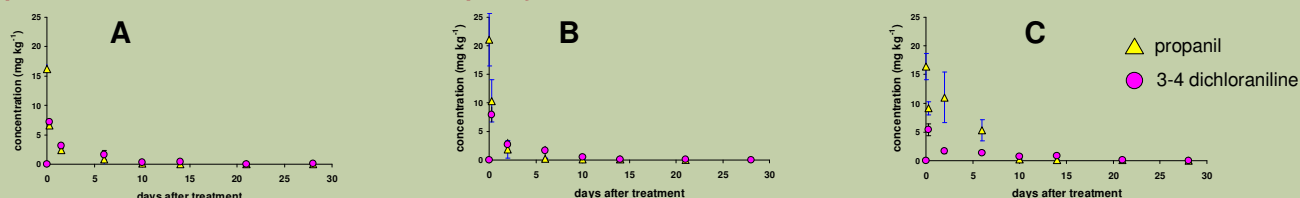
- Soil extraction with acetone
- Water extraction by SPE (C<sub>18</sub>)
- Reverse phase HPLC analysis

## • RESULTS and DISCUSSION

### Propanil and 3-4 dichloraniline residues in the SOIL SOLUTION collected at different depths

Propanil and dichloraniline concentrations in all samples < 1,0 µg L<sup>-1</sup> : negligible leaching of the compounds.

### Propanil and 3- 4 dichloraniline residues in paddy field SEDIMENT



- Rapid dissipation of propanil in the sediment of plots A and B ( $t_{1/2}$  < 1 day) and slower dissipation in plot C ( $t_{1/2}$  < 6 days) likely depending on lower degrading capacity of the soil microflora of plot C.
- Residual propanil concentrations < 0.02 mg kg<sup>-1</sup> after 21 days in all conditions.
- Formation of 3-4 dichloraniline, promptly degraded to residual levels < 0.02 mg kg<sup>-1</sup> after 21 days in all the studied plots.

### Propanil and 3- 4 dichloraniline residues in paddy field WATER



- Propanil and 3-4 dichloraniline concentrations < 10 mg L<sup>-1</sup> in the water of the three paddy fields at the flooding time (9 days after treatment) in agreement with the low concentrations present in the sediment.
- No detectable residues (< 0,05 mg L<sup>-1</sup>) of both propanil and 3-4 dichloraniline after 50 days in the three treated plots.

## • CONCLUSIONS

The herbicide propanil and its metabolite 3-4 dichloraniline were not persistent in the studied paddy fields suggesting a high capacity of the soil and water microorganisms to degrade the molecules.

The repeated propanil treatments over the years might have induced an enhanced biodegradation process.

The high dissipation rates of propanil and 3-4 dichloraniline did not allow to evaluate the effect of the agronomical practices on the fate of the compounds.