



**EJP SOIL**  
**AGROECOseqC**

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**INRAE**  
la science pour la vie, l'humain, la terre

## Soil nitrogen pool dynamics in an agroecological gradient



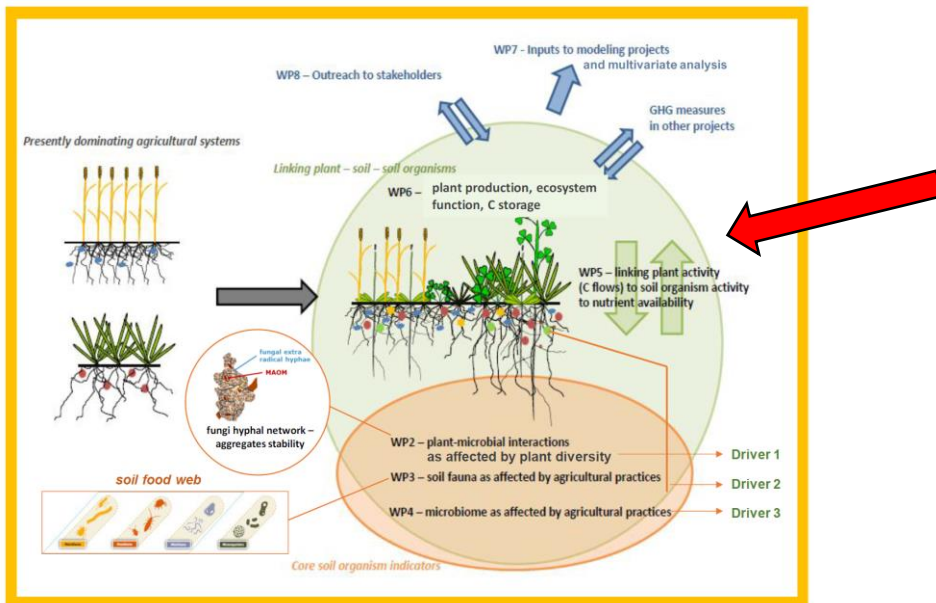
Antonio Rodriguez, Sandrine Revaillet & Sebastien Fontaine

**EJP SOIL Annual Science days – June 2024**

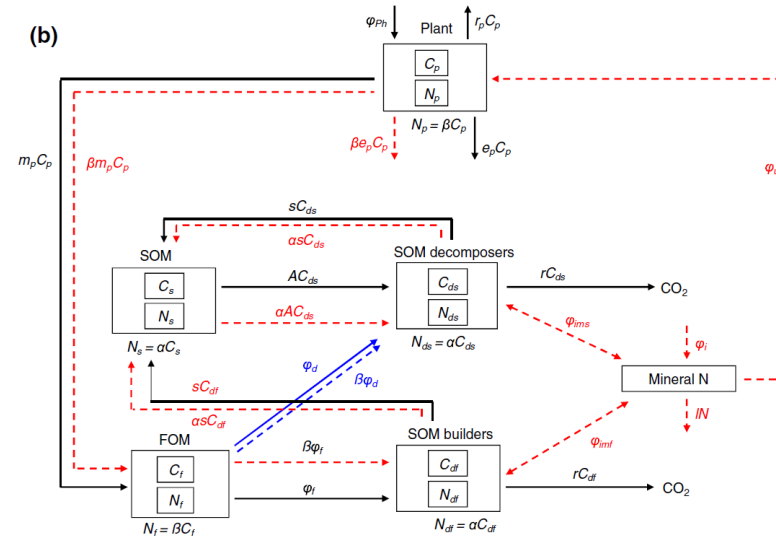
## WP5

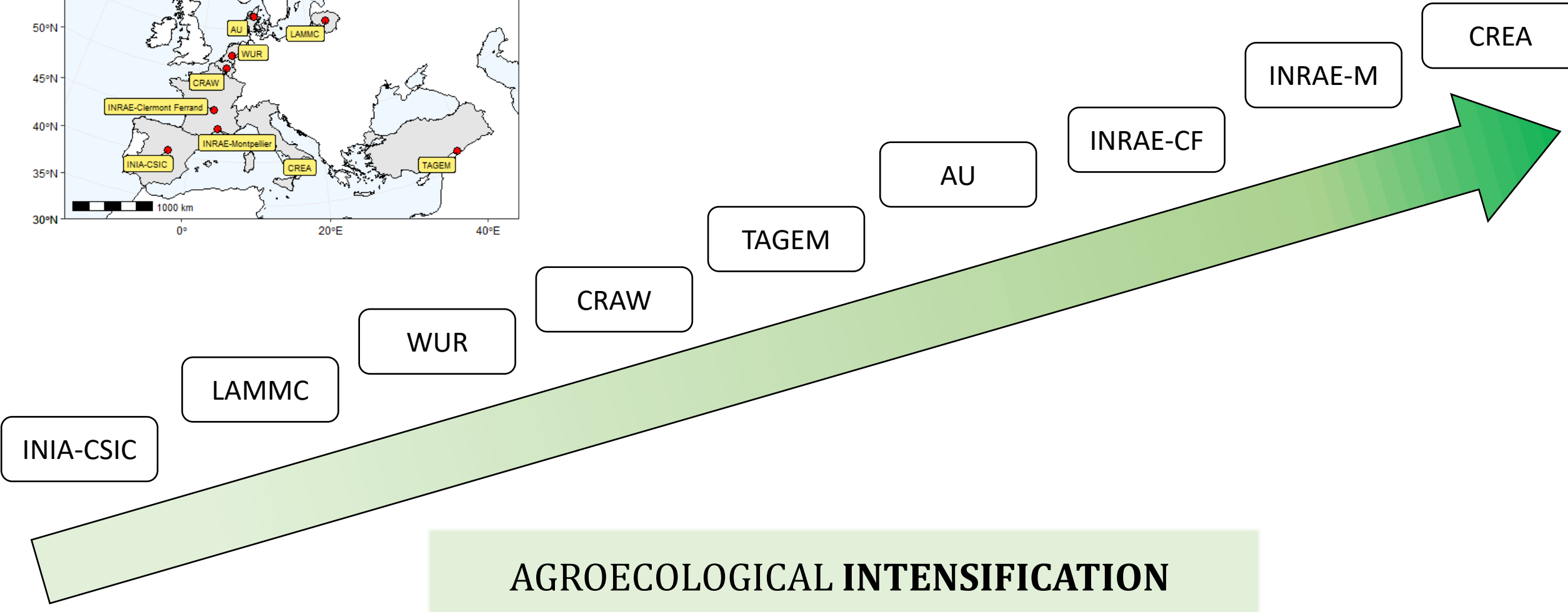
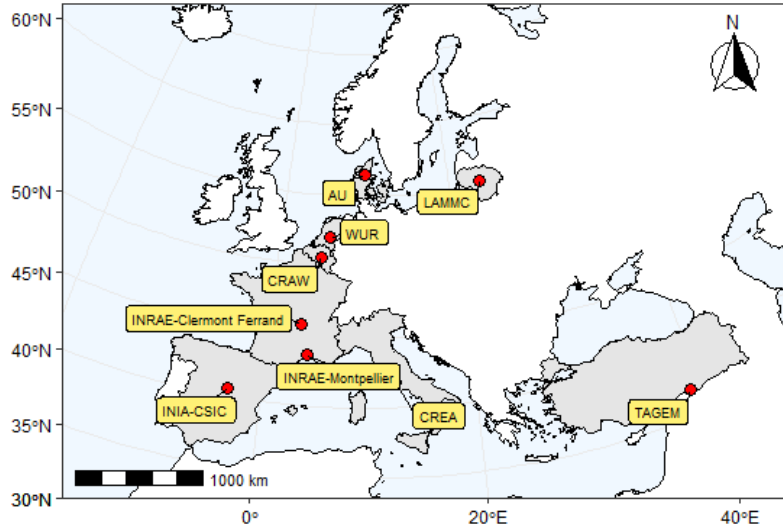
### Level of synchrony between plant nutrient demand, soil nutrient fluxes and soil organic matter dynamics

#### The AGROECOseqC project



#### The Symphony model





**AGROECOLOGICAL INTENSIFICATION**



## WP5 Task 5.2

### Soil nitrogen fluxes as affected by plant demand, microbial functioning and agricultural practices

- 2 sampling times per site at both low and high plant nutrient demand
- Three treatments with four replicates:



T1

Improved agroecological  
practice



T2

2<sup>nd</sup> improved agroecological  
practice

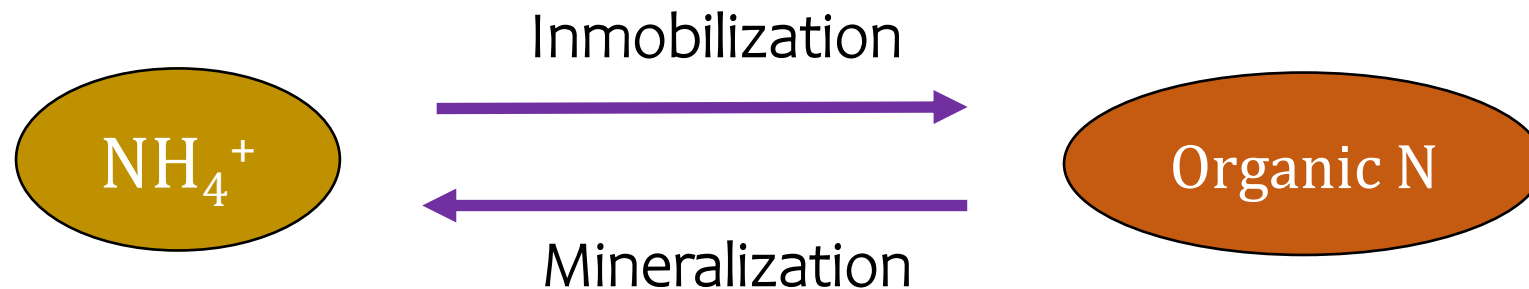


T3

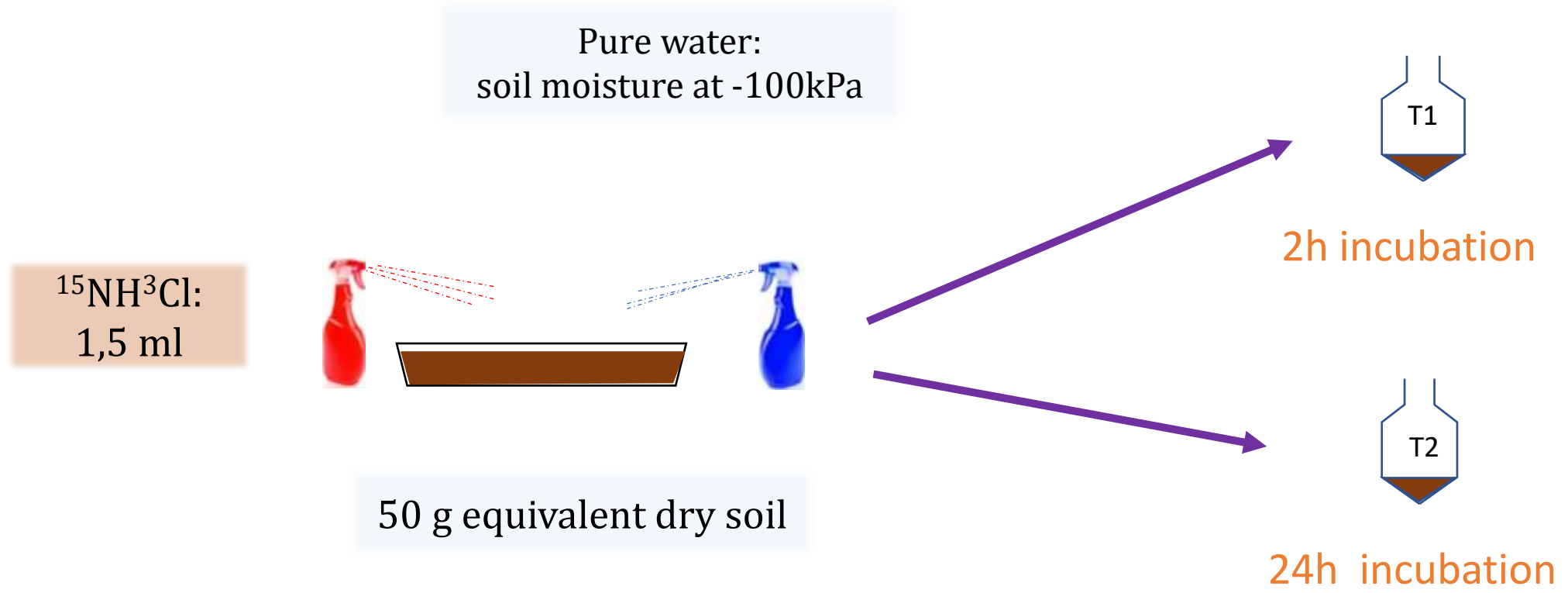
Control (business as usual practice)

Soil nitrogen fluxes as affected by plant demand, microbial functioning and agricultural practices

Soil nitrogen fluxes

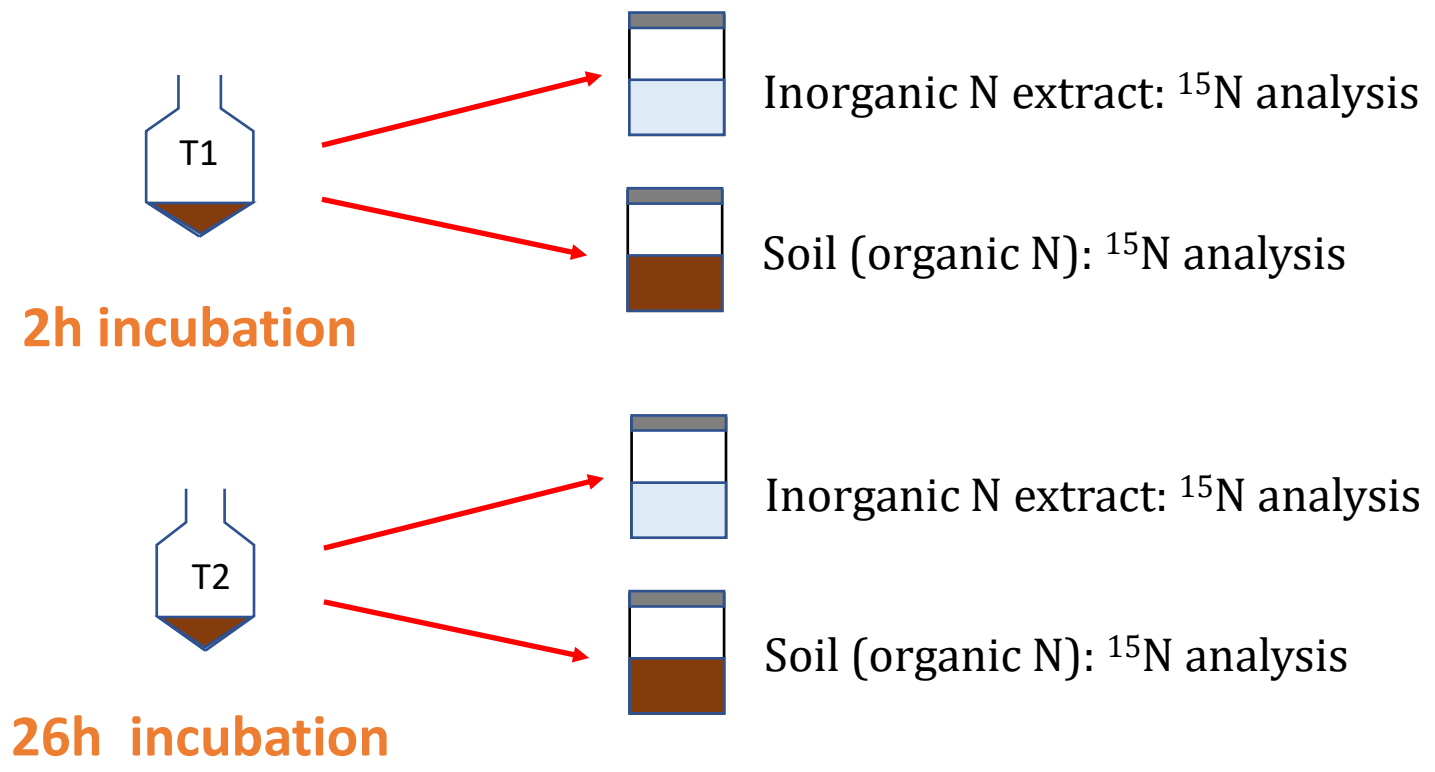


## The $^{15}\text{N}$ isotope dilution method (Davidson, 1993)





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Inorganic N extract:  $\text{NH}_4^+$

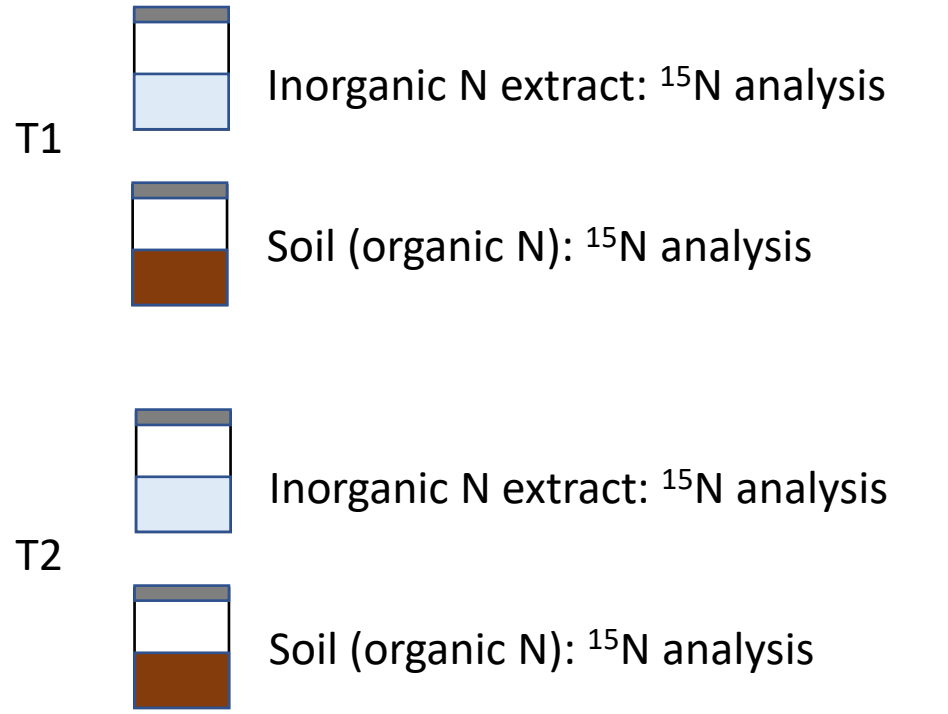
→  
Microdiffusion


Filter disc for mass spectrophotometer





## The $^{15}\text{N}$ isotope dilution method (Davidson, 1993)



  
**Calculations!**

N Mineralization

N Immobilization

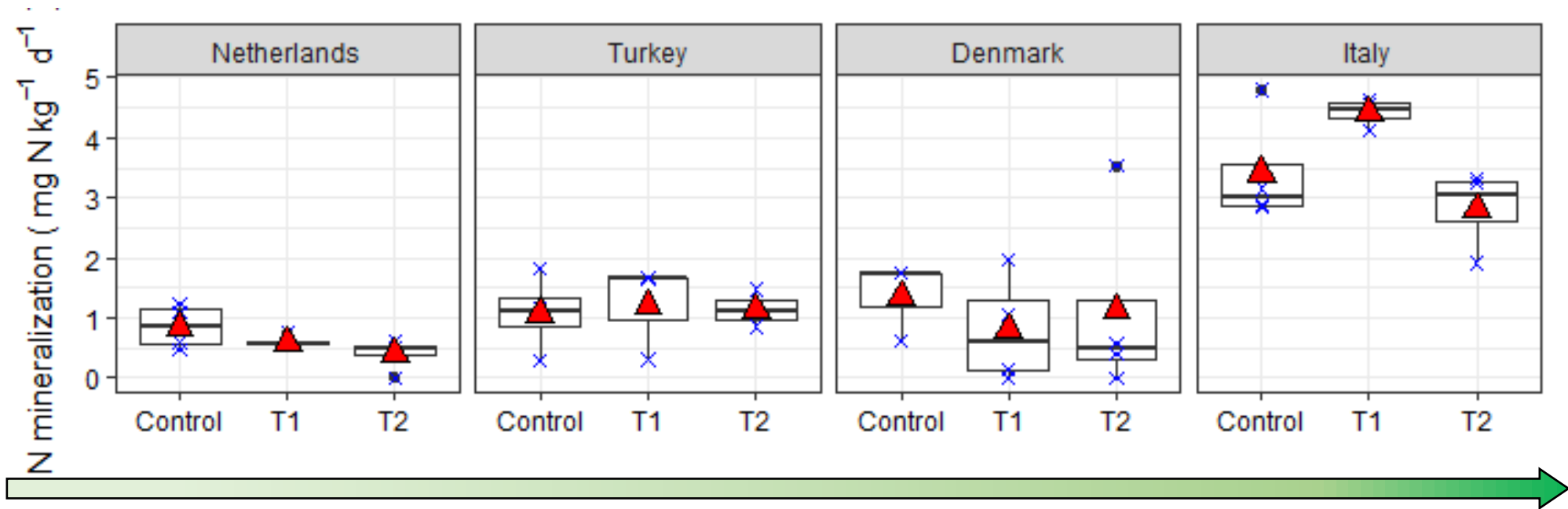
The  $^{15}\text{N}$  isotope dilution method (Davidson, 1993)

$$m = \frac{(M_0 - M_1)}{t} \frac{\ln(H_0 M_1 / H_1 M_0)}{\ln(M_0 - M_1)}$$

m/i

$$i = \frac{v_{t=1}}{\left(\frac{y_0}{x_0}\right) \frac{1 - e^{-k}}{k}}$$

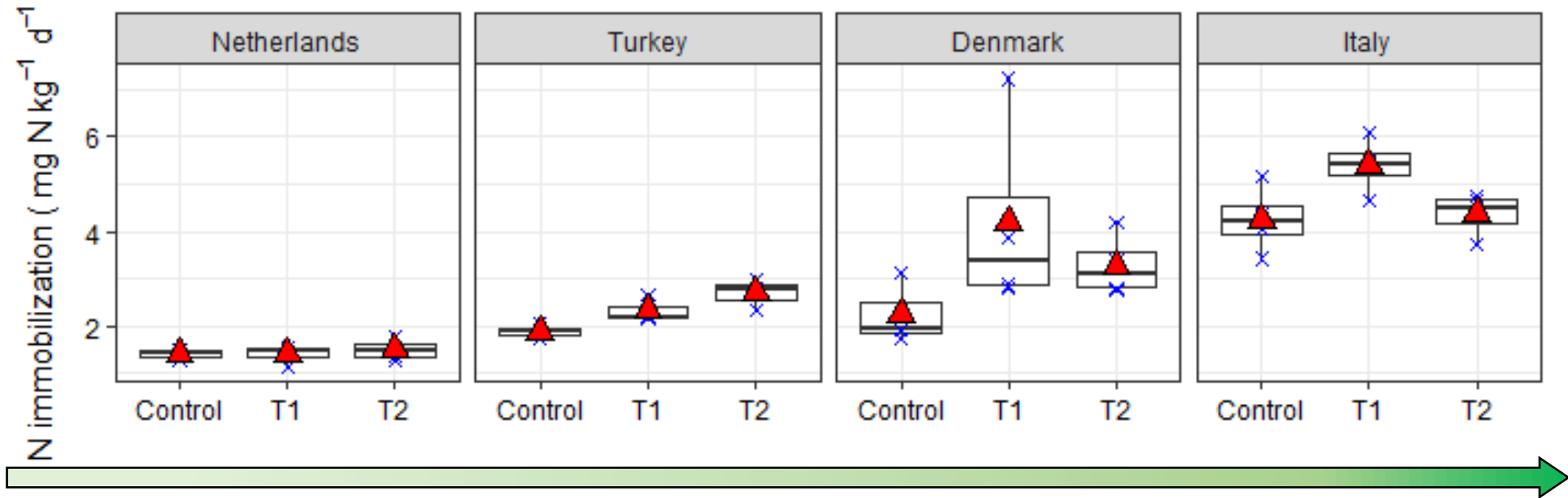
Soil N mineralization  
(minimum plant nutrient demand)



- ▲ Mean value
- × Sample value

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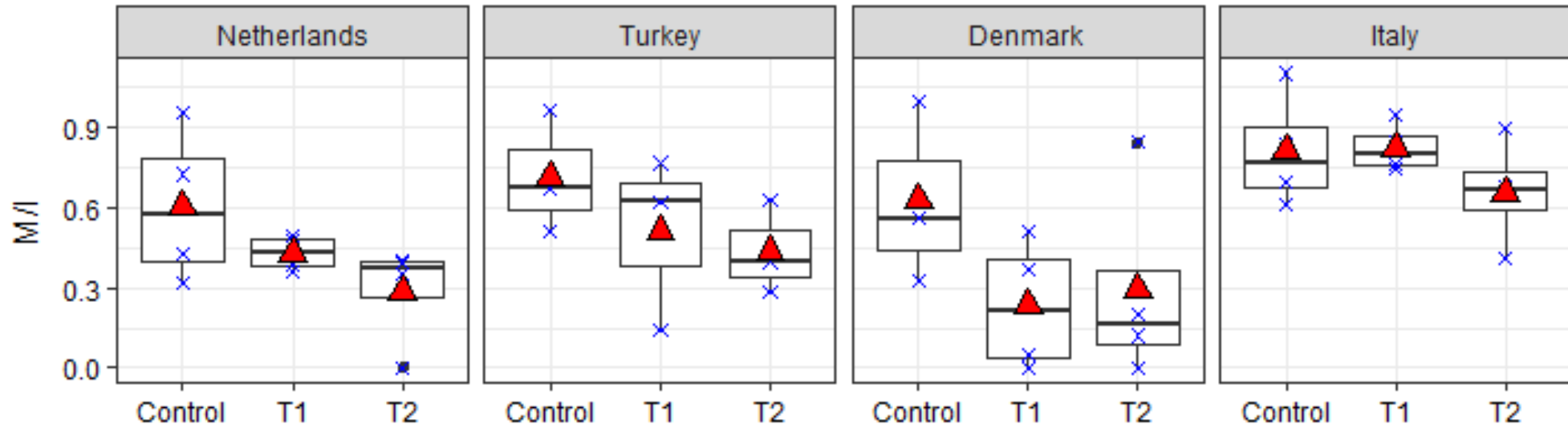
Soil N immobilization  
(minimum plant nutrient demand)



- ▲ Mean value
- × Sample value

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Soil Mineralization-Immobilization ratio at minimum plant nutrient demand



**AGROECOLOGICAL INTENSIFICATION**

- ▲ Mean value
- × Sample value

### Take home messages

(preliminary results for minimum plant  
nutrient demand)

- Changes in N mineralization occurred only in the site with the highest agroecological intensity (Italy).
- The agroecological practices showed an increase in N immobilization. The difference seemed to increase with the agroecological intensity of the sites.
- We can observe some decrease in M/I when comparing the agroecological practices with the control.

**COMING SOON**