



**HAL**  
open science

## Soil structure changes in No tillage system over time

Marine Lacoste, Hubert Boizard, Jerome Labreuche

► **To cite this version:**

Marine Lacoste, Hubert Boizard, Jerome Labreuche. Soil structure changes in No tillage system over time. 21. International Soil Tillage Research Organization (ISTRO). 2018 ISTRO Conference, Sep 2018, Paris, France. , 2018. hal-02786225

**HAL Id: hal-02786225**

**<https://hal.inrae.fr/hal-02786225>**

Submitted on 4 Jun 2020

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

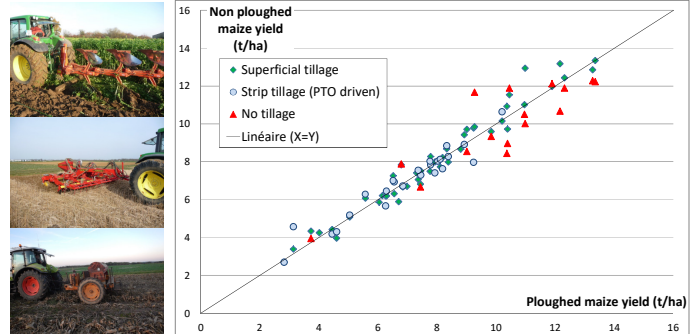
L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

# Soil structure changes in No tillage system over time

## Long-term field experiment of Boigneville

Long term experiment set up in 1970:

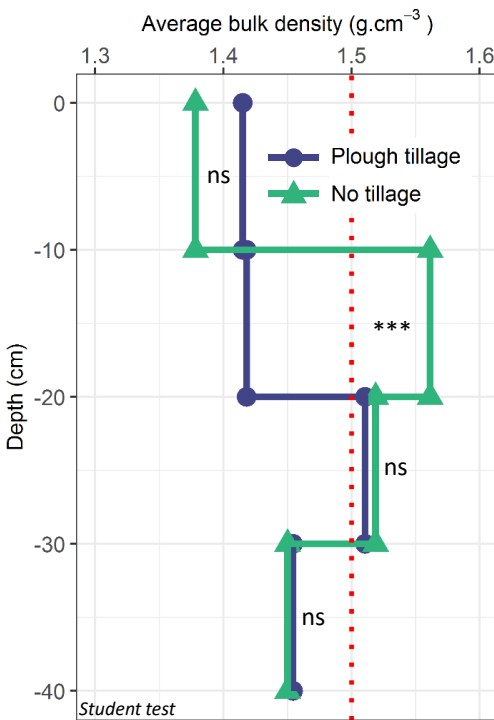
- Temperate oceanic climate (rain: 630 mm/year)
- Orthic luvisol developed on loess (24% of clay, 1.0% carbon, good drainage)
- Maize-wheat rotation with three tillage systems:
  - Mouldboard Plough Tillage (20 cm)
  - Superficial Tillage (5 to 10 cm)
  - No Tillage



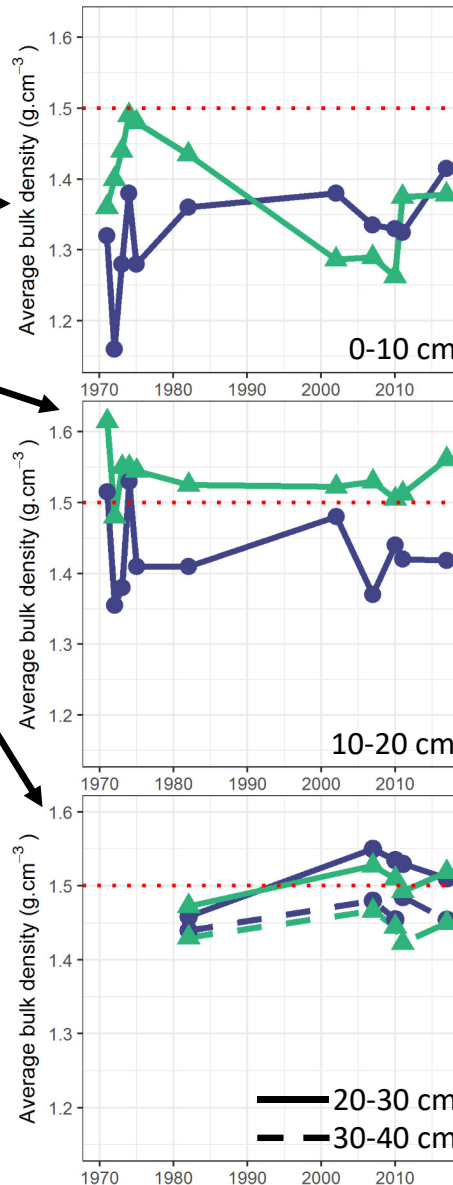
Very close wheat and maize yields whatever the soil tillage system (if yield gap, explained by crop emergence and not by soil structure).

## Bulk density (BD) for the maize-wheat rotation

### BD depth profile in 2017



### BD evolution from 1970 to 2017



**0-10 cm:** Lower BD due to seedbed preparation and higher carbon content. High variation over time whatever the system.

**10-20 cm:** High BD for No tillage (BD > 1.5).

**20-30 and 30-40 cm:** Small soil tillage impact on BD. Medium BD, stable over time.

- High BD (> 1.5) for No tillage system on 10-30 cm and for Plough tillage system on 20-30 cm.
- Correlated to a low structural porosity (< 5%)
- Further analysis of biologic and climatic porosity are necessary: work in progress associated to morphological analysis ("profil cultural" method)