# Soil structure changes in No tillage system over time

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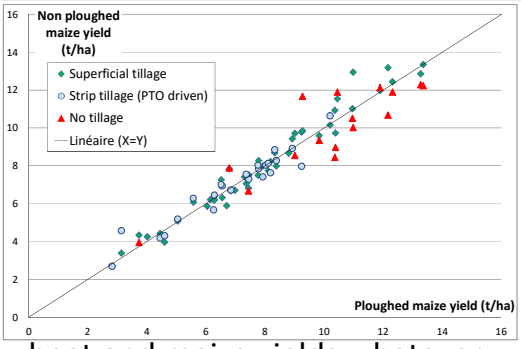
## ❖ Long-term field experiment of Boigneville

Long term experiment set up in 1970:

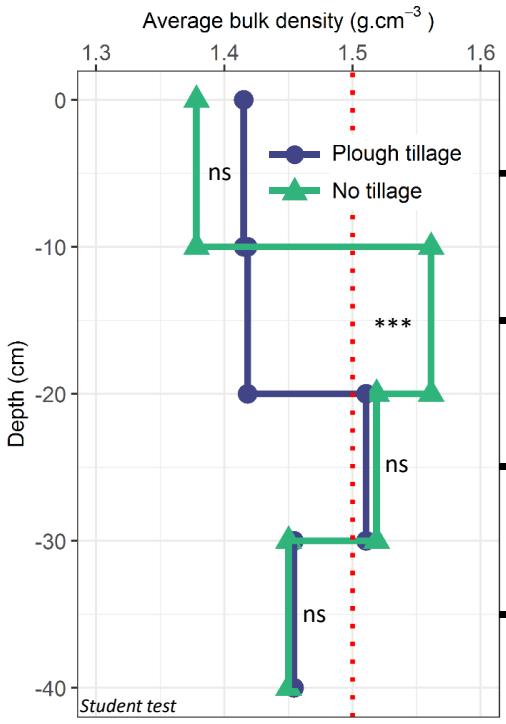
- Temperate oceanic climate (rain: 630 mm/year)
- Orthic luvisol developed on loess (24% of clay, 1.0% carbon, good drainage)
- Maize-wheat rotation with three tillage systems:
  - ➢ Mouldboard Plough Tillage (20 cm)
  - ➢ Superficial Tillage (5 to 10 cm)
  - ➢ No Tillage



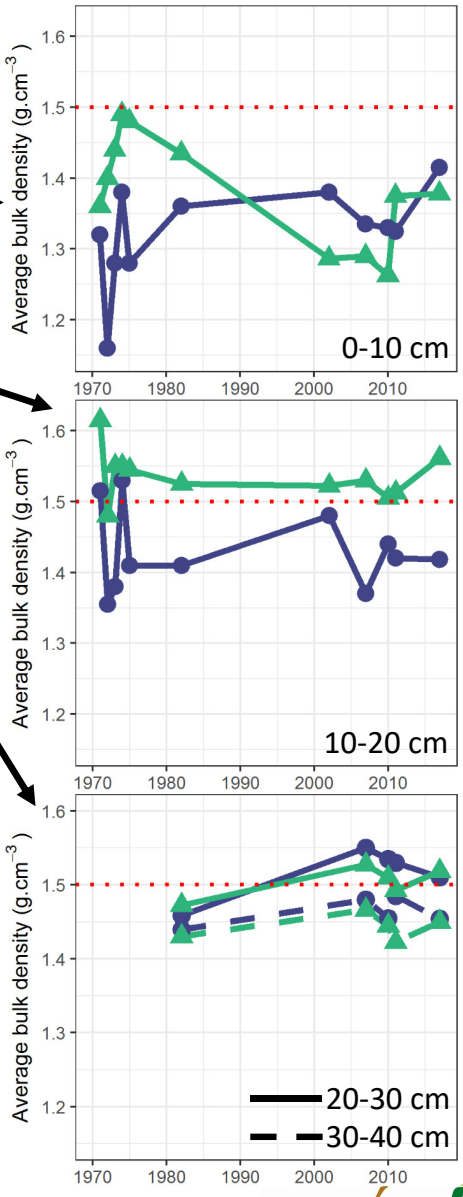

Very close wheat and maize yields whatever the soil tillage system (if yield gap, explained by crop emergence and not by soil structure).

## ❖ 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)

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