Comparison of tillage systems in Organic farming : Thil long-term experiment

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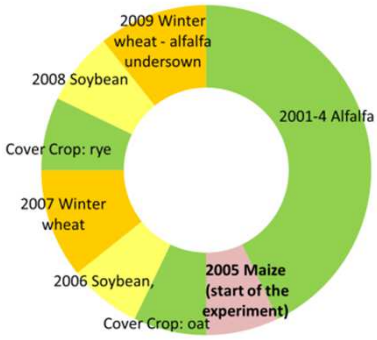
Description:
Field experiment to adapt reduced **or** no tillage to organic **grain** system on a sandy soil.
Irrigated system.

Site: Thil, France
Climate: Precipitation 830 mm/year
Mean annual temperature: 10.3 ºC



First crop rotation 2004-2010

4 Tillage treatments:
T1. **Plough** at 30 cm depth (MP)
T2. **Shallow plough** at 18cm depth (SP)
T3. **Reduced tillage** with chisel at 15 cm depth (RT)
T4. **Very superficial tillage** (5 cm)/direct seeding with crimper roller (ST/NT)

3 randomized replicates for each treatment

Second crop rotation 2010-2014

Figure 1: Grain yields (in t/ha)

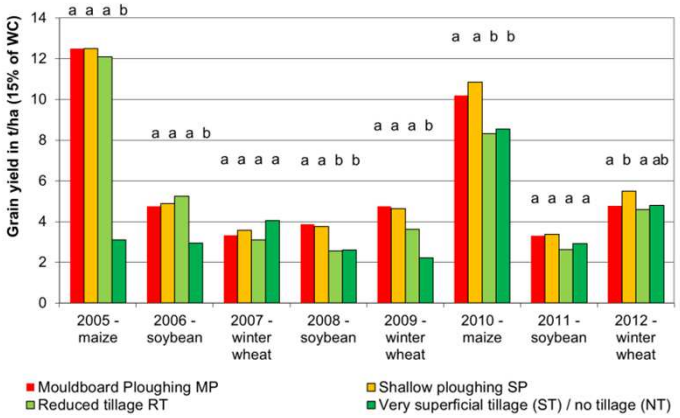
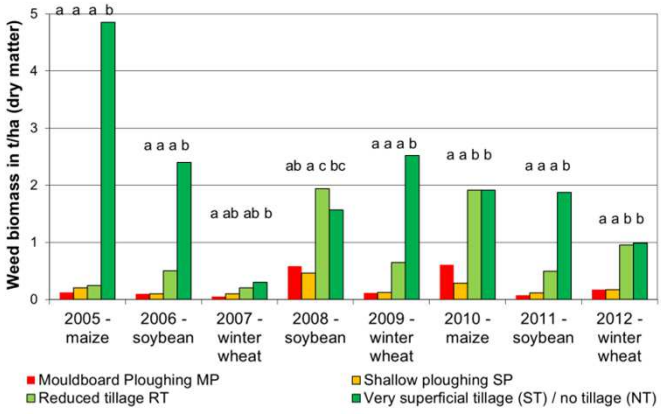


Figure 2: Weed biomass (in t/ha) at crop harvest



Different letters mean a significant difference ($p < 0.05$)

Main results : Reduced tillage vs plough

- **Crop**
  - Yields: 25% to 75 % less with direct seeding (ST/NT) (Figure 1)
  - High weed infestation with ST/NT – Increasing weeds with RT (Figure 2)
  - Along the crop rotation: Variable yields with RT and ST/NT according to weeds and soil fertility
  - Shallow ploughing reaches the best yields (mean along the crop rotations) thanks to weed control by soil inversion and higher organic matter compared to traditional ploughing.
- **Soil**
  - Risk of soil compaction with RT and ST
  - Higher earthworm density and activity with direct seeding under a cover crop

These compilation of results has been achieved in TILMAN-ORG, within the framework of the 1st call on Research within Core-Organic II, with funding from the French Ministry of Agriculture.