

# COMPARISON BETWEEN PRODUCTION DATA OF CORN GROWN IN NATURAL AND RECONSTITUTED SOILS

Paolo Manfredi<sup>1</sup>, Chiara Cassinari<sup>2</sup>, Dante Tassi<sup>3</sup>, Marco Trevisan<sup>2</sup>

1 m.c.m. Ecosistemi s.r.l., Gariga di Podenzano, Piacenza

2 Istituto di Chimica Agraria e Ambientale, Università Cattolica del Sacro Cuore, Piacenza

3 Azienda Sperimentale «Vittorio Tadini», Gariga di Podenzano, Piacenza

## Objective

To evaluate the yield of corn (*Zea mays*), with the same doses of fertilizer but with different amounts of irrigation water, grown on natural versus reconstituted soil (area of work Gossolengo, Piacenza), to test the ability of the reconstituted soils to improve water availability for plant and to evaluate the soil chemical characters after treatment.

**RECONSTITUTED SOIL:** soil resulting by an innovative chemical-mechanical treatment for recovering degraded soil.

Technology:

- mechanical disgregation
- controlled integration of soil improvers
- polycondensation with humic acids
- final reconstitution with mechanical action

The reconstituted soil has these properties:

- Improvement of the structure and increased structural stability
- Increase and stabilization of organic matter
- Reduction of soil compaction
- Increased water retention capacity
- Improvement of the heat capacity
- Increased cation exchange capacity
- Enhancing the buffer
- Increase in fertility
- Enhancement of biodiversity

## Irrigation

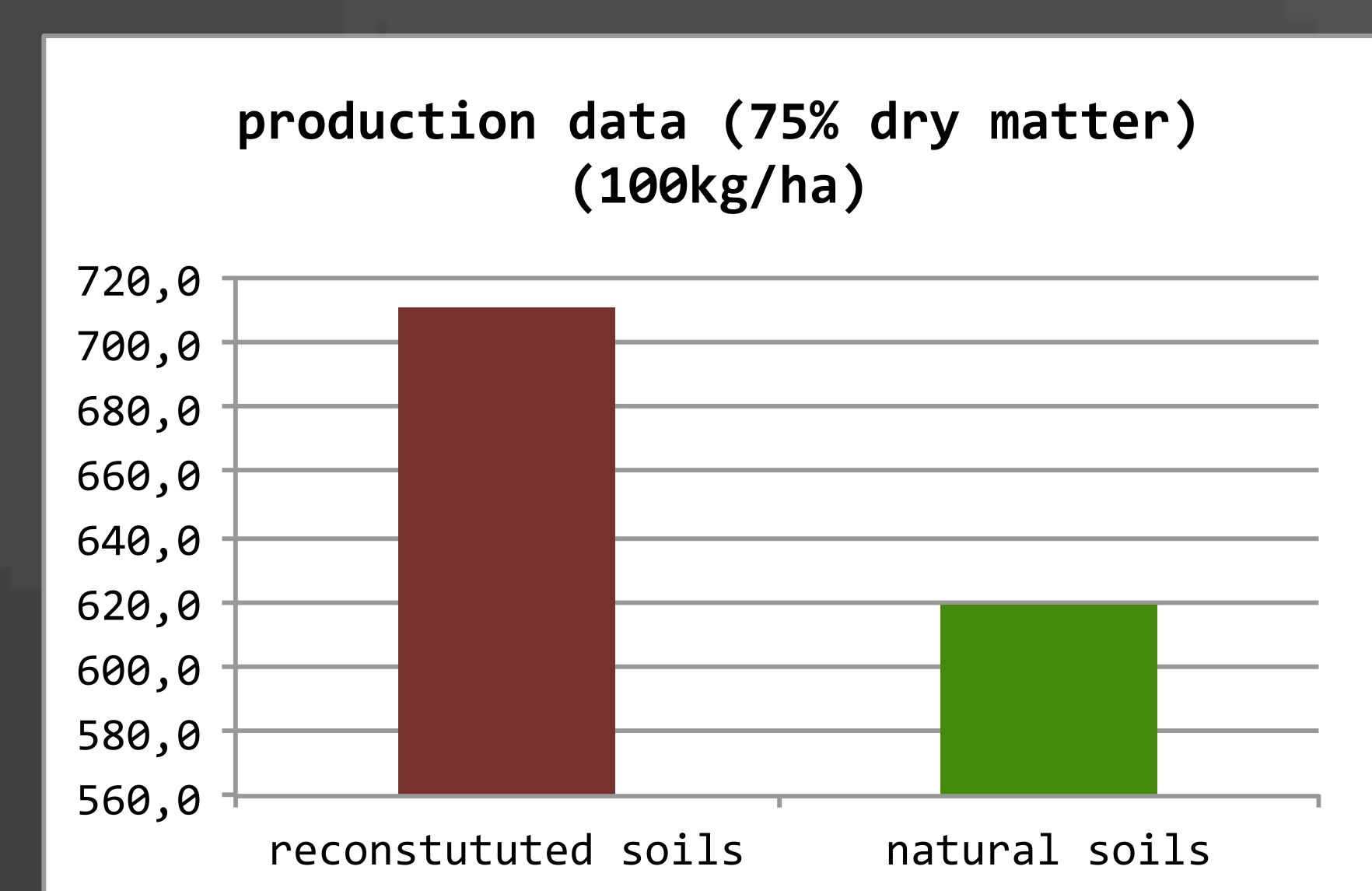
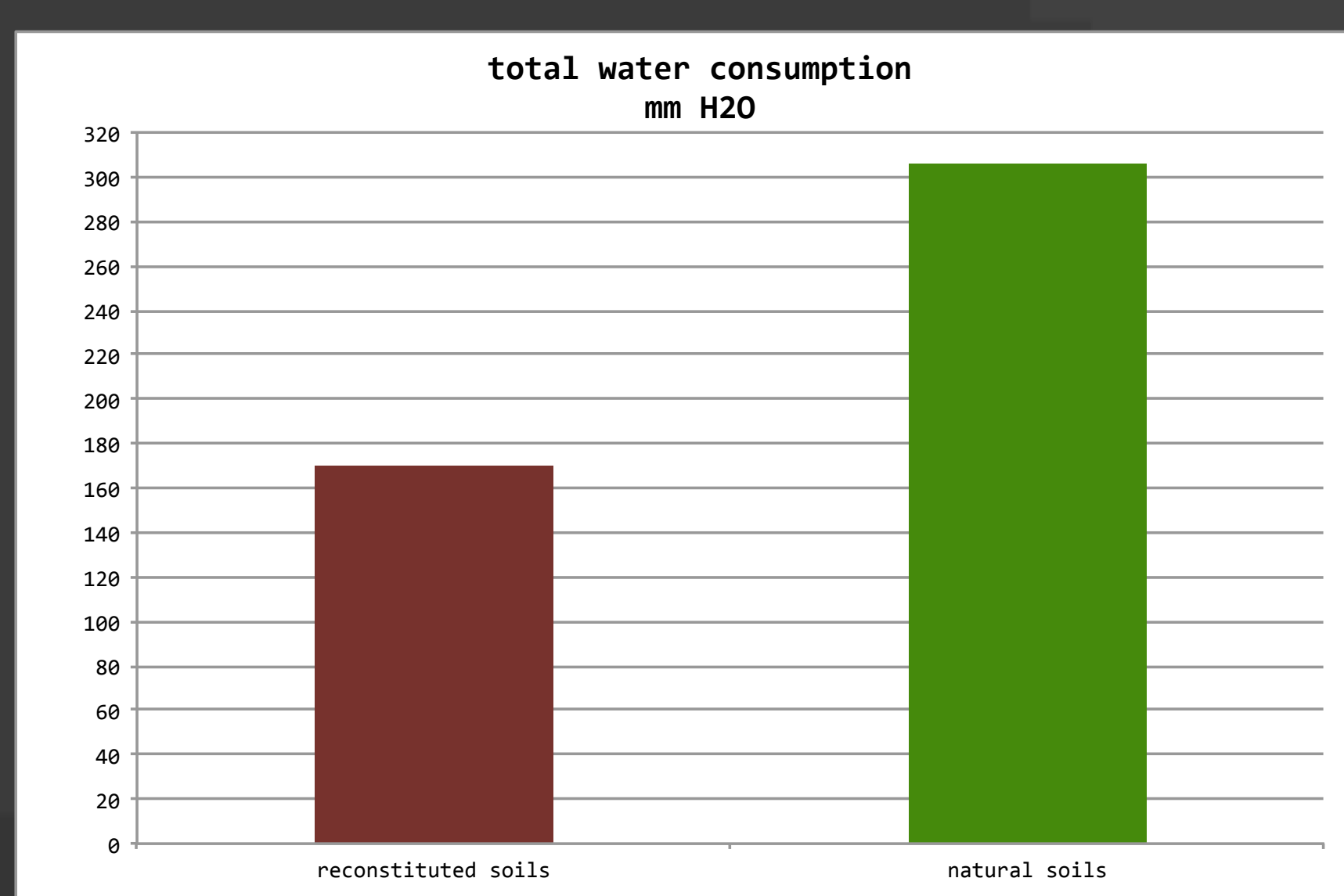
Performed in the same period and with the same irrigator, changing the speed return to have 45% less water on the reconstituted soils.

## Statistical analysis and results

ANOVA; LSD (Least Significant Difference) and SNK (Student-Newman-Keuls).

Software: IBM SPSS Statistics 19.

There are no significant difference between natural and reconstituted soil.



The results of the chemical analyses performed on the natural and reconstituted soils show the improvements after treatment.

It wasn't possible to present the results of the current year production because the weather conditions shifts sowing and reaping dates.

It is confirmed by the crop now present the trend of the previous year with further improvements: the corn in reconstituted soil is more lush, more green, taller and with larger ears than that in natural soil. Another improvements is that the corn in reconstituted soil avoided nitrogen fertilization and the water utilized has been further reduced to 50% compared to the natural soil.

	sample	sand (g/Kg)	clay (g/Kg)	silt (g/Kg)	pH	bulk density (g/cm <sup>3</sup> )	CaCO <sub>3</sub> (g/Kg)	salinity (dS/m)	tot C (%)	org C (g/kg)	O.M. (g/kg)	tot N (g/kg)	tot S (g/kg)	P (Olsen) (mg/kg)	P <sub>2</sub> O <sub>5</sub> (mg/kg)
natural soil	1	403	150	447	8,1	1,86	213,57	0,320	3,80	12,89	22,22	2,30	0,53	67,63	154,97
	2	317	160	523	8,2	1,53	174,52	0,214	3,37	11,80	20,34	1,60	0,32	62,21	142,54
	3	344	130	526	8,0	1,53	218,15	0,239	3,48	11,73	20,22	1,70	0,34	54,44	124,74
	mean	355	147	498	8,1	1,64	202,08	0,258	3,55	12,14	20,93	1,87	0,40	61,42	140,75
	devst				0,1	0,19	23,98	0,06	0,22	0,65	1,12	0,38	0,12	6,63	15,19
reconstituted soil	1A	203	175	622	7,7	1,15	114,99	0,357	5,80	44,75	77,15	4,50	0,95	83,79	191,99
	2A	395	27	578	8,0	1,11	221,17	0,708	7,84	44,37	76,49	3,50	0,57	68,97	158,05
	3A	374	195	432	7,9	0,99	211,36	0,913	7,32	48,34	83,34	3,90	0,50	67,66	155,04
	4A	348	33	619	8,0	1,08	173,13	1,230	5,87	38,16	65,79	3,80	0,73	75,12	172,15
	mean	330	107	563	7,9	1,08	180,16	0,802	6,71	43,90	75,69	3,93	0,69	73,89	169,31
	devst				0,1	0,07	48,14	0,37	1,03	4,23	7,29	0,42	0,20	7,36	16,86

From these results and the other studies to improve the knowledge of these new soils, the reconstitution technology can be said to be able to act against the soil degradation and to restore degraded and desertified soils.



UNIVERSITÀ  
CATTOLICA  
del Sacro Cuore

