



# BENEFITS OF GRAZING PORTUGUESE INDIGENOUS LAYING HENS ON SOIL FERTILITY

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## INTRODUCTION

**Poultry** can contribute to farm **sustainability**, as additional sources of **income** and as resources that can **control weeds** and **fertilize crops**, reducing inputs.

**OBJECTIVE** - compare the effects of **laying hens** on soil fertility with two **weed control treatments**.

## MATERIALS and METHODS

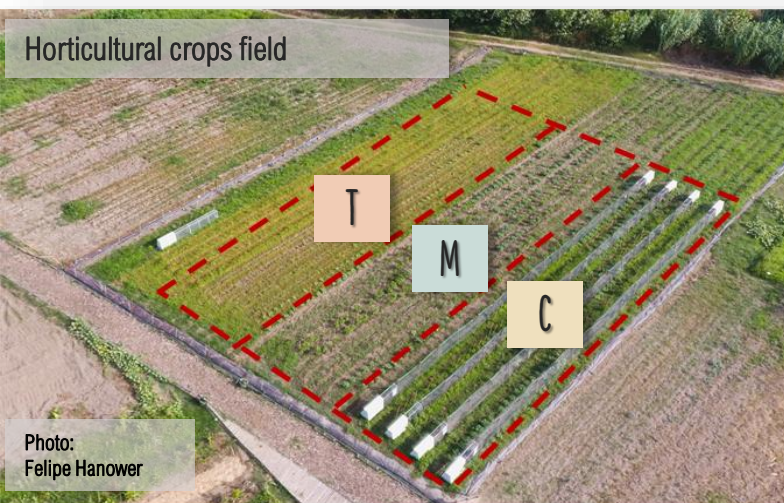


Photo:  
Felipe Hanower

**T** - Thermal treatment (flame weeding)

**M** - Mechanical treatment (hand-held tiller)

**C** - Chicken treatment (Portuguese hens)

- 4 fixed tunnels - 84 days of grazing

- 2<sup>nd</sup> year of pasture

- European Regulations for Organic Farming fulfilled



**Soil parameters analyzed:** soil organic carbon, total nitrogen, ammoniacal and nitric nitrogen, extractable phosphorus and potassium, micronutrients copper, zinc, iron and manganese, and total aerobic and nitrogen-fixing bacteria abundances.

## CONCLUSIONS

The results suggest a **significant contribution** of the Portuguese laying hens to **soil fertility**, by increasing the **availability of nutrients** and by increasing **microbial populations**.



## RESULTS

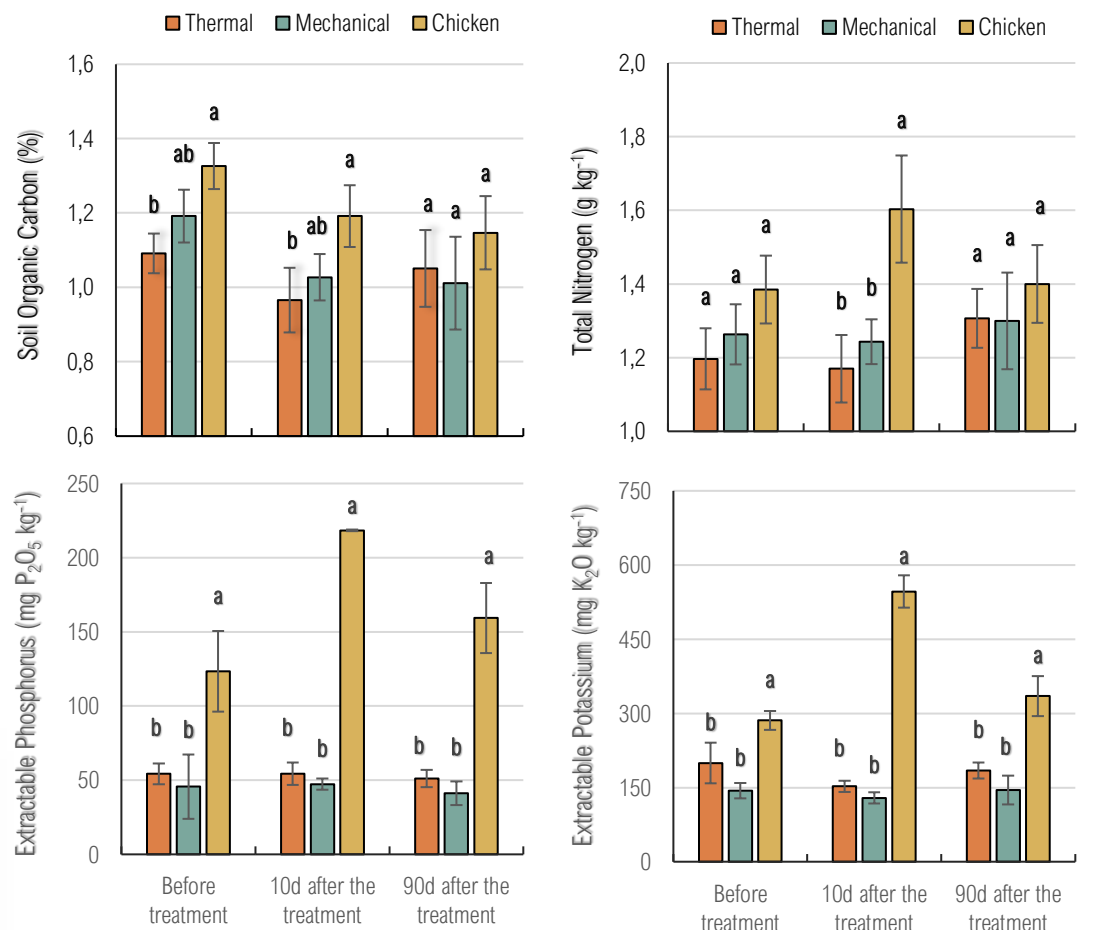
**Chickens' weed control method higher in:**

- **Extractable nutrient contents** – except Cu and Fe; grazing in the previous year → Higher amounts “before treatment” are due to grazing in the previous year
- **Population abundance of total aerobic and N-fixing bacteria**
- **Total soil organic carbon** compared to thermal treatment - similar to the mechanical treatment
- **Total N, NH<sub>4</sub><sup>+</sup>-N and NO<sub>3</sub><sup>-</sup>-N after grazing** - no differences found 90 days after pasture

Period	Treatment	Zn (mg kg <sup>-1</sup> )	Mn (mg kg <sup>-1</sup> )	Total Aerobic Bacteria (log CFU g <sup>-1</sup> )	N-Fixing Bacteria (log CFU g <sup>-1</sup> )
Before treatment	T	2.83 <sup>b</sup> ± 0.12	14.67 <sup>b</sup> ± 1.16	-	-
	M	2.87 <sup>b</sup> ± 0.15	15.33 <sup>b</sup> ± 2.31	-	-
	C	4.87 <sup>a</sup> ± 0.55	19.67 <sup>a</sup> ± 2.52	6.00 <sup>A</sup> ± 0.16	5.77 <sup>A</sup> ± 0.11
10 days after treatment	T	4.40 <sup>b</sup> ± 0.14	10.00 <sup>b</sup> ± 0.00	5.66 <sup>b</sup> ± 0.18	5.67 <sup>b</sup> ± 0.09
	M	4.15 <sup>b</sup> ± 0.07	11.67 <sup>b</sup> ± 0.58	5.64 <sup>b</sup> ± 0.17	5.72 <sup>b</sup> ± 0.18
	C	5.70 <sup>a</sup> ± 0.42	18.33 <sup>a</sup> ± 3.22	6.03 <sup>aA</sup> ± 0.23	5.94 <sup>aB</sup> ± 0.15
90 days after treatment	T	2.93 <sup>b</sup> ± 0.40	19.63 <sup>b</sup> ± 2.48	5.92 <sup>b</sup> ± 0.08	6.02 <sup>b</sup> ± 0.07
	M	2.73 <sup>b</sup> ± 0.25	19.43 <sup>b</sup> ± 0.59	6.00 <sup>ab</sup> ± 0.09	6.00 <sup>b</sup> ± 0.10
	C	5.20 <sup>a</sup> ± 0.36	24.03 <sup>a</sup> ± 1.37	6.12 <sup>aA</sup> ± 0.10	6.16 <sup>aC</sup> ± 0.05

Within each period different lowercase letters mean statistical differences ( $P < 0.05$ ) between treatments.

Within the chicken treatment different uppercase letters denote statistical differences ( $P < 0.05$ ) between time periods.



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