Effect of LivinGro® treatment on soil health indicators in an experimental crop plot in Zaragoza (Spain)

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INTRODUCTION

Agriculture faces the constant challenge of maximising productivity while minimising environmental impact.

Population pressure and inappropriate management practices are leading to accelerated soil degradation, which encompasses physical, chemical, biological and ecological aspects
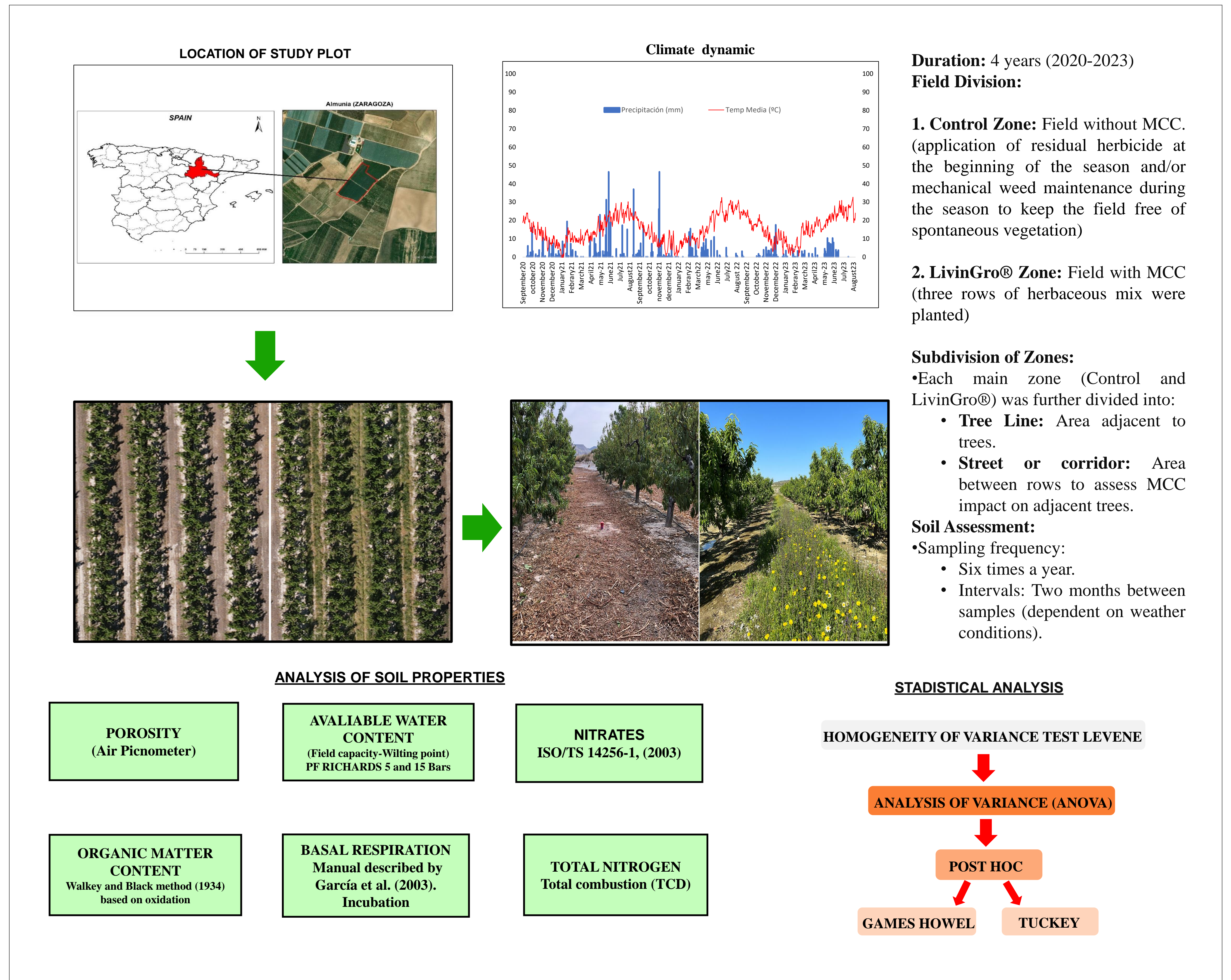
This degradation reduces soil quality, with serious consequences for agriculture and human well-being. Decreases in organic matter and carbon content, as well as in microbial activity, are associated with soil degradation.

In this context, cover crops emerge as a promising strategy to improve soil health, reduce erosion, conserve water and promote biodiversity in agro-ecosystems.
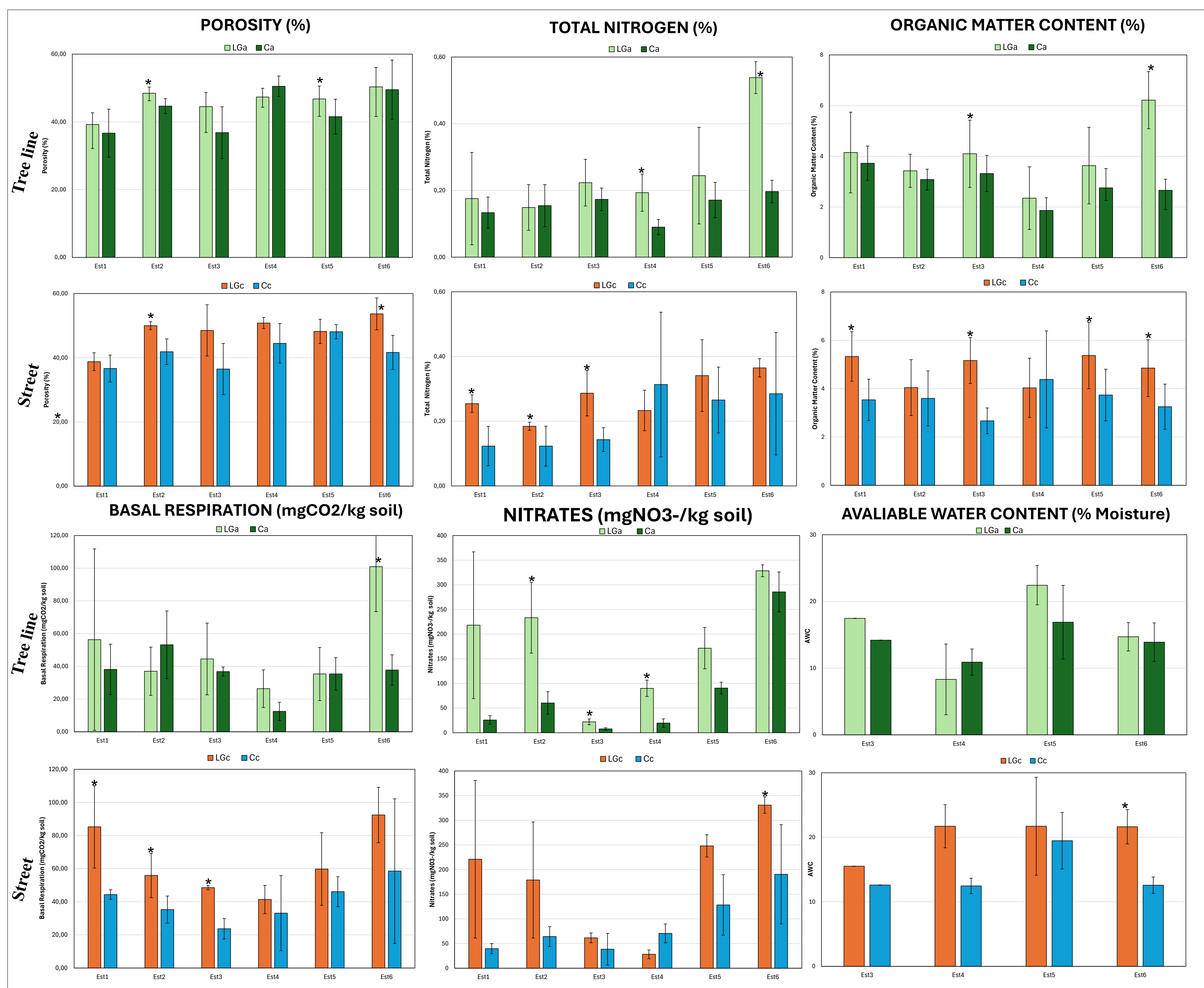
OBJETIVES

1. Evaluation of the impact of Multifunctional Vegetative Cover on Soil Physical, Chemical, and Biochemical Properties in Cultivated Areas.

2. Comparative analysis between Livingro® Treatment and Local Conventional Methods: Assessing Differences and Spatial Distribution in Cultivate Plots

MATERIALS AND METHODS

Duration: 4 years (2020-2023)
Field Division:

1. Control Zone: Field without MCC. (application of residual herbicide at the beginning of the season and/or mechanical weed maintenance during the season to keep the field free of spontaneous vegetation)

2. LivinGro® Zone: Field with MCC (three rows of herbaceous mix were planted)

Subdivision of Zones:
• Each main zone (Control and LivinGro®) was further divided into:
  • **Tree Line:** Area adjacent to trees.
  • **Street or corridor:** Area between rows to assess MCC impact on adjacent trees.
Soil Assessment:
• Sampling frequency:
  • Six times a year.
  • Intervals: Two months between samples (dependent on weather conditions).

ANALYSIS OF SOIL PROPERTIES

POROSITY (Air Picnometer)	AVALIABLE WATER CONTENT (Field capacity-Wilting point) PF RICHARDS 5 and 15 Bars	NITRATES ISO/TS 14256-1, (2003)
ORGANIC MATTER CONTENT Walkey and Black method (1934) based on oxidation	BASAL RESPIRATION Manual described by García et al. (2003). Incubation	TOTAL NITROGEN Total combustion (TCD)

STADISTICAL ANALYSIS

HOMOGENEITY OF VARIANCE TEST LEVENE

ANALYSIS OF VARIANCE (ANOVA)

POST HOC

GAMES HOWEL — TUCKEY

RESULTS

Est1: October 2020-April 2021
Est 2: May 2021- September 2021
Est 3: October 2021-April 2022
Est 4: May 2022-September 2022
Est 5: October 2022-April 2023
Est 6: May 2023- September 2023

LGa: Livingro treatment Tree line
LGc: Livingro treatment Street or corridor
Ca: Control Tree line
Cc: Control Street or corridor

★ Significance of the differents between treatments by stadistics analysis (ANOVA) with P-value<= 0.05

CONCLUSIONS

Livingro ® zone is improving soil health, particularly in key indicators such as basal respiration, organic matter content and nitrogen.

Differences between treatments in the streets show higher statistical significance in ANOVA compared to those along the tree line.

ACKNOWLEDGEMENTS