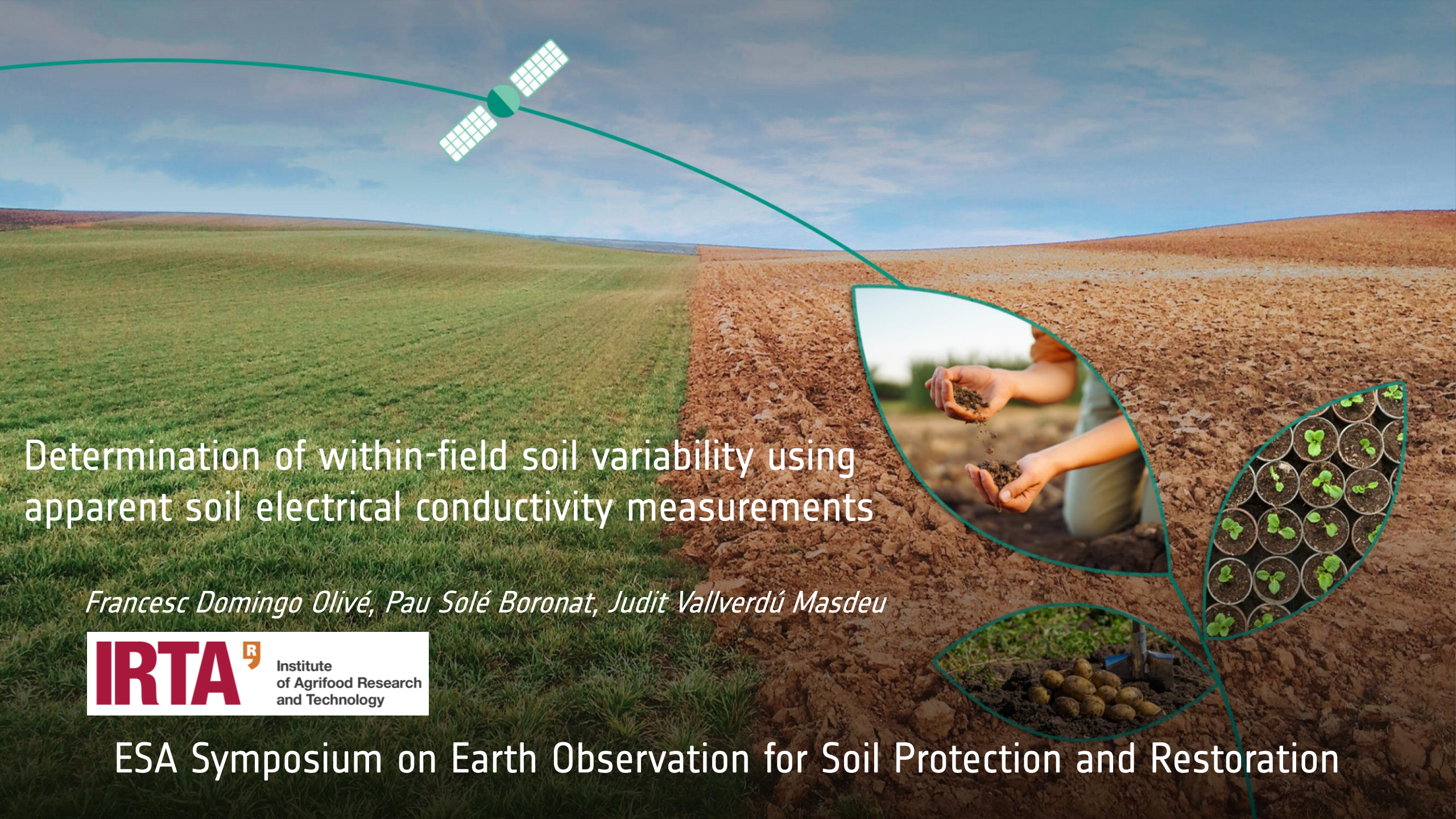


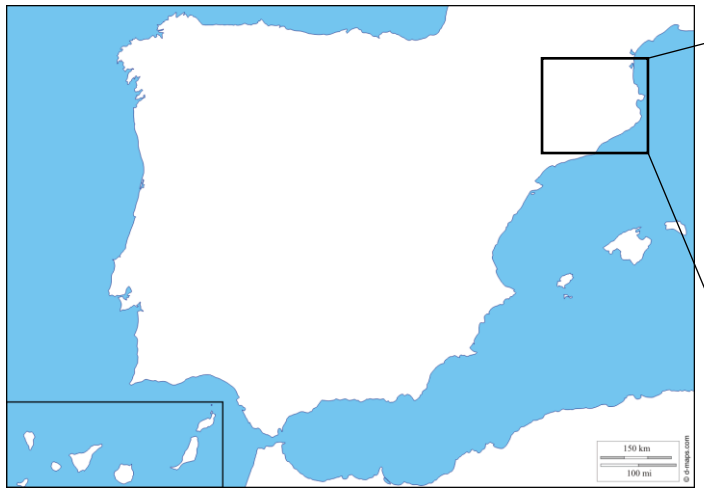
# Determination of within-field soil variability using apparent soil electrical conductivity measurements

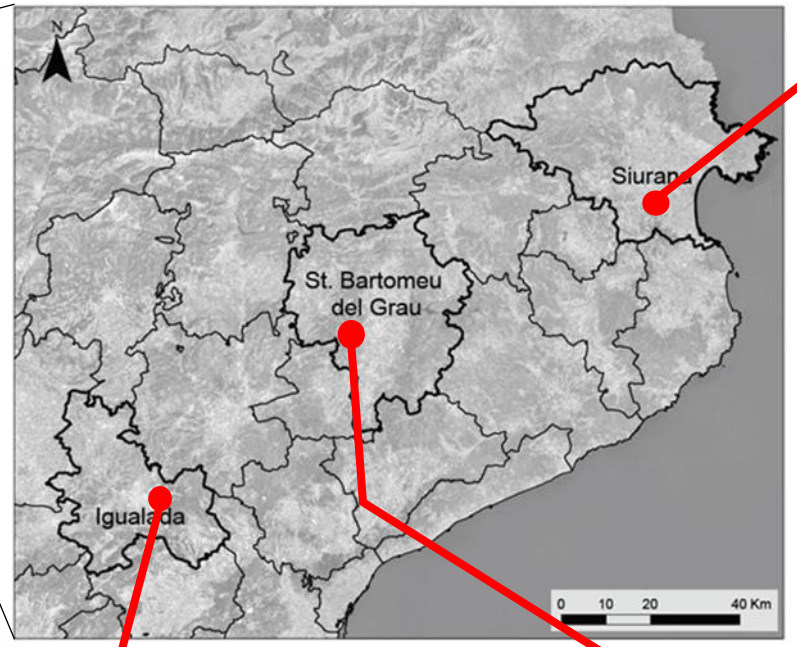
*Francesc Domingo Olivé, Pau Solé Boronat, Judit Vallverdú Masdeu*

IRTA Institute of Agrifood Research and Technology

ESA Symposium on Earth Observation for Soil Protection and Restoration

# The variability of the soils of 3 commercial plots in North-Eastern Iberian peninsula was characterized using ECa sensors.

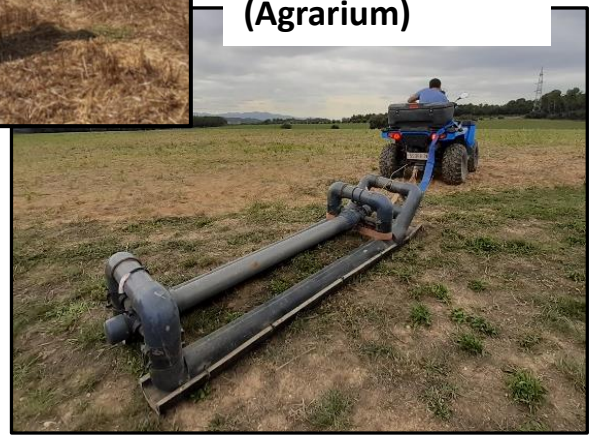





**Typic Xerorthent / Typic Calcixerept**
**From 25 cm to >100 cm depth**
**pH: 8,3 EC: 0,18 dS/m**
**1-35 % Stones**

**EM38 Sensor (Georeva)**

**Dualem-2 Sensor (Agrarium)**



**Typic Xerorthent**
**From 40 cm to >100 cm depth**
**pH: 8,3 EC: 0,24 dS/m**
**1-35 % Stones**

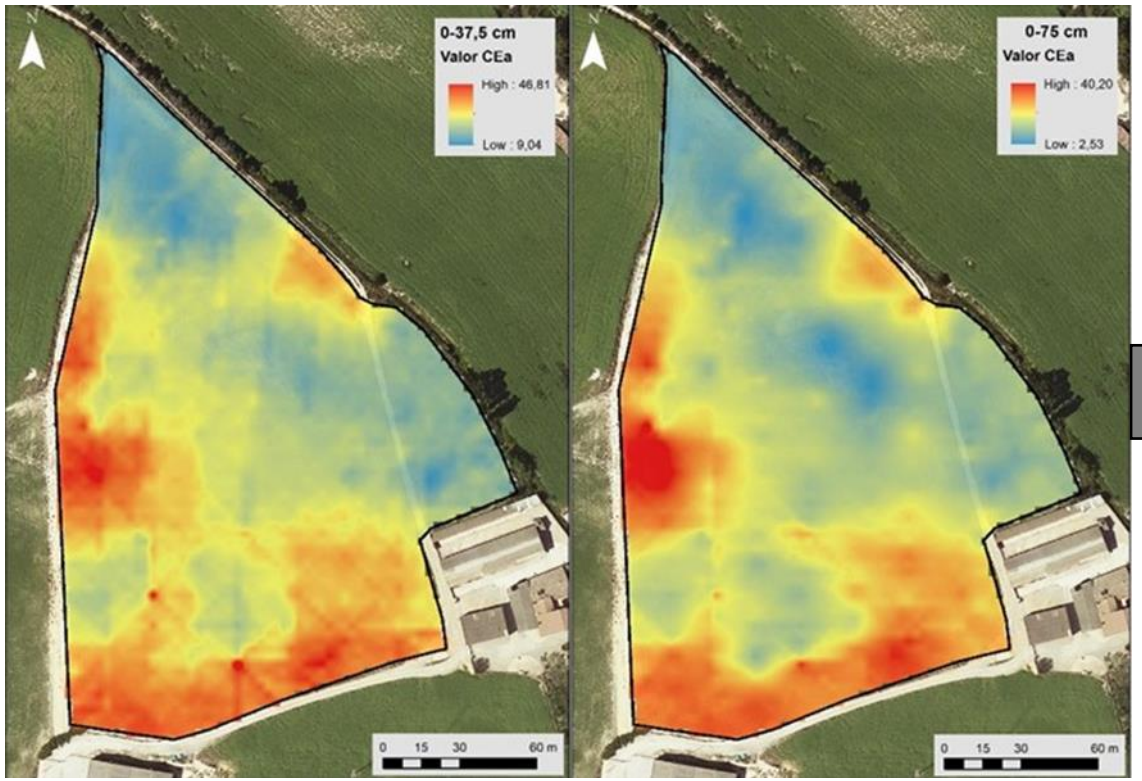
**Typic Ustorthent**
**From 40 cm to >100 cm depth**
**pH: 8,4 EC: 0,23 dS/m**
**1-5 % Stones**

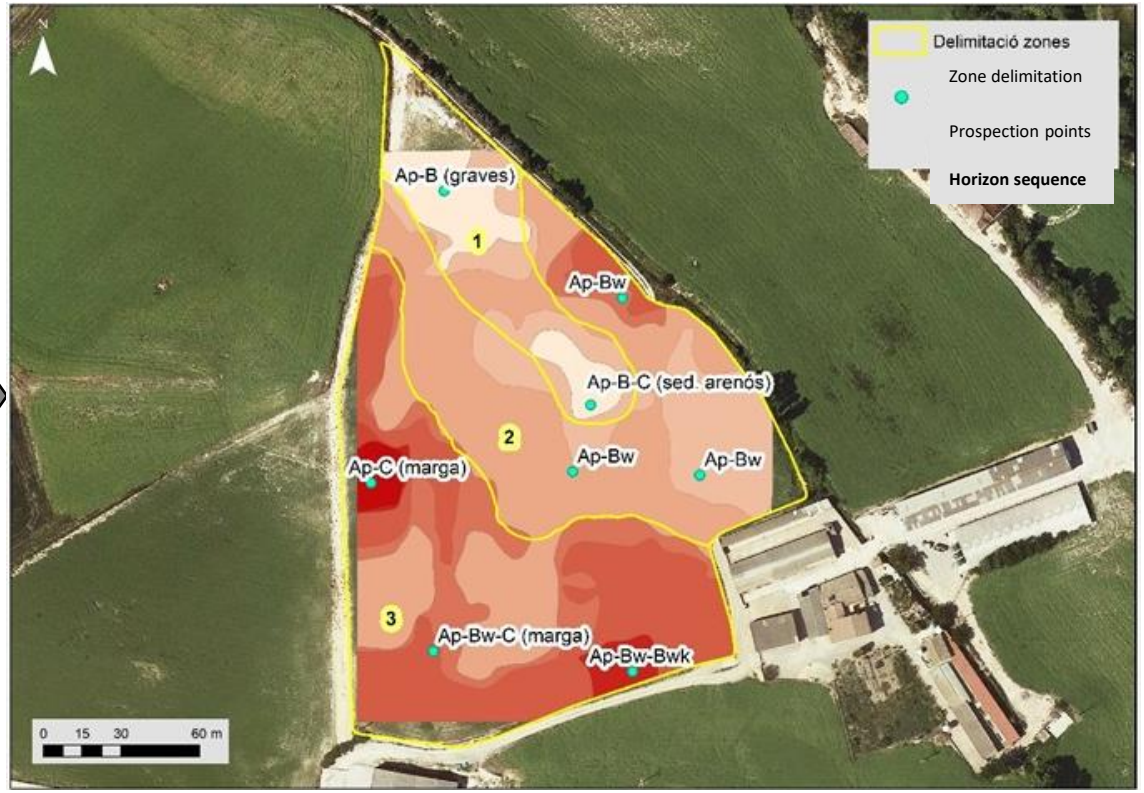
IRTA MAS BADIA

# Using the raw data from the sensors, each plot was divided into different zones, and the soils from each zone were characterized.

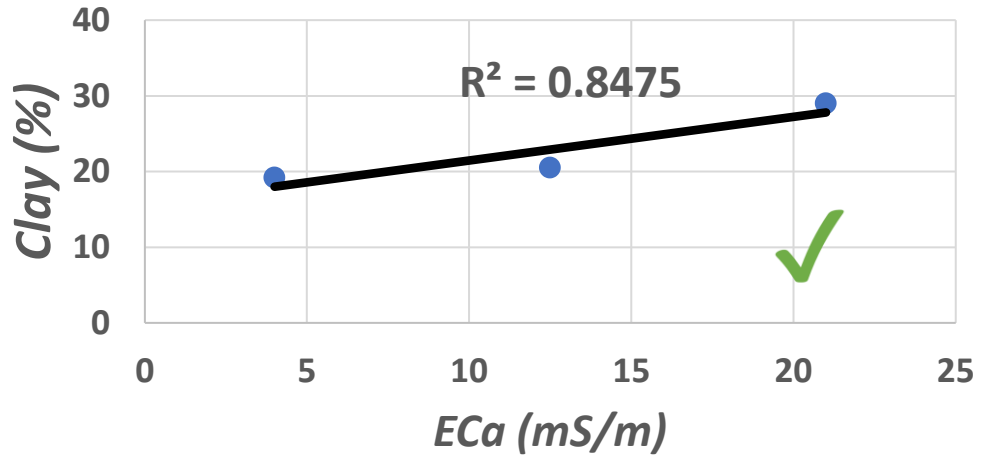
*Top soil*

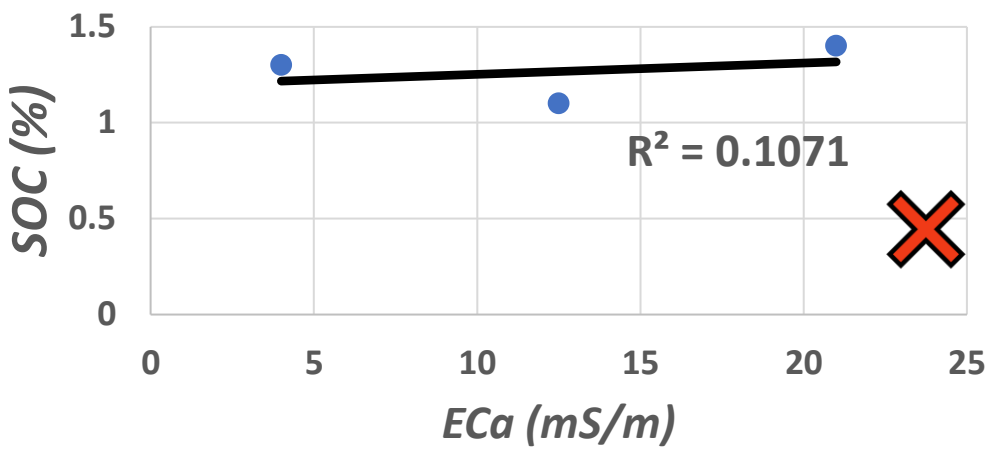
*Whole soil*

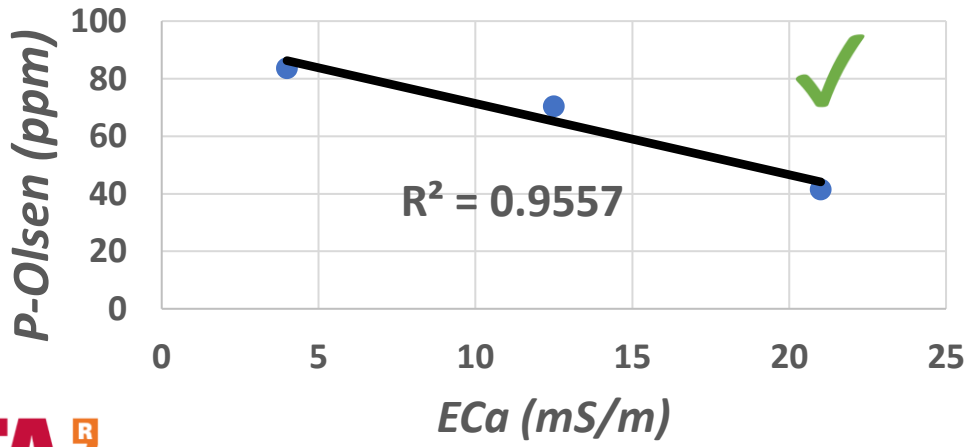


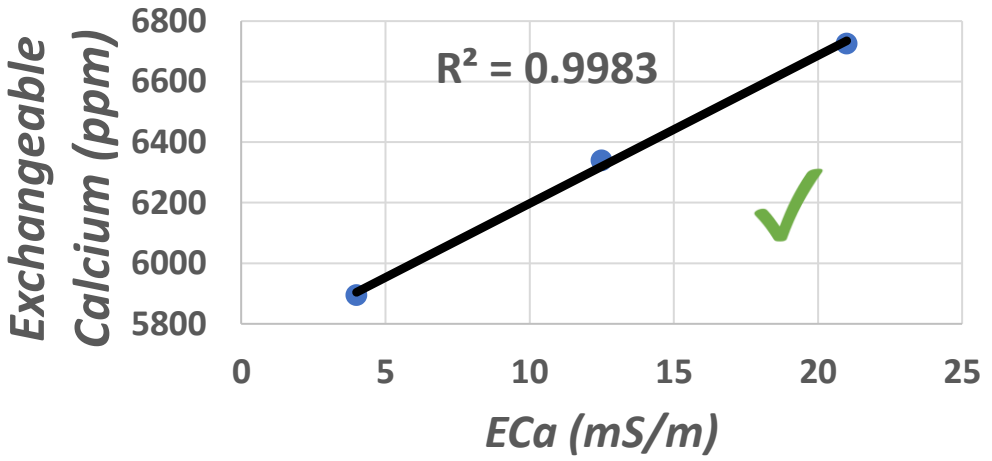



# What was observed? – 1st plot (Calcixerept)

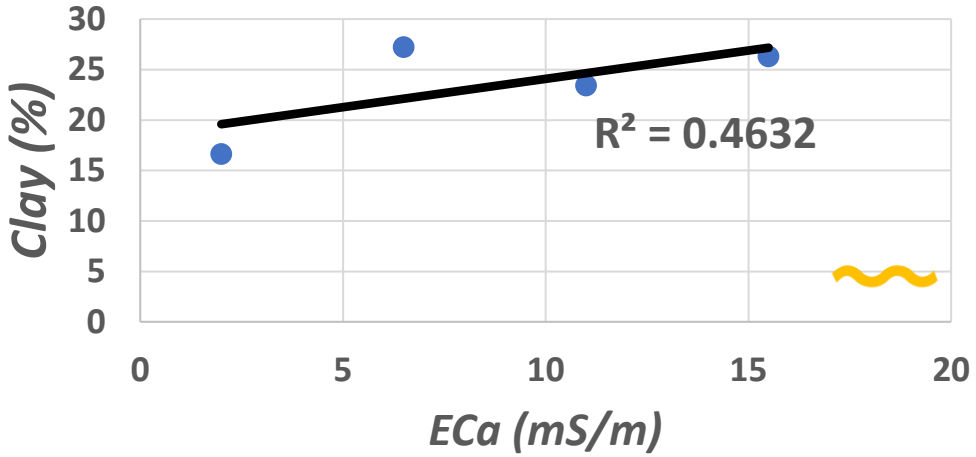


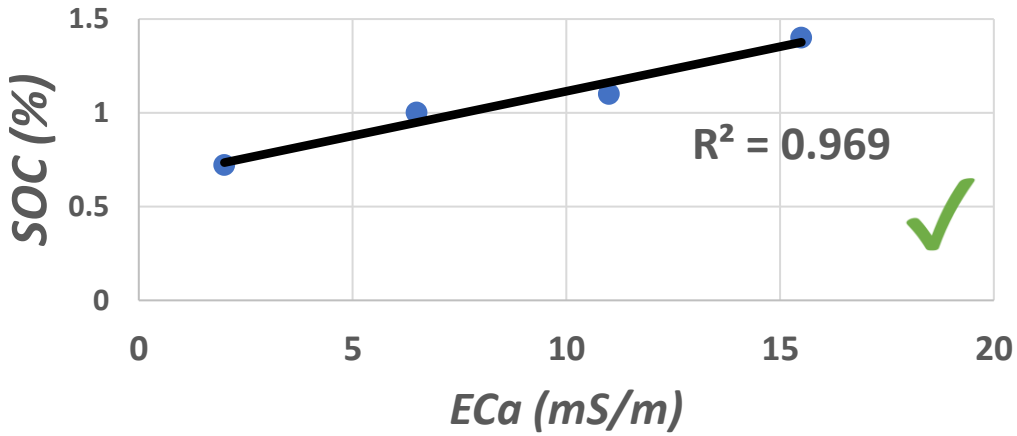



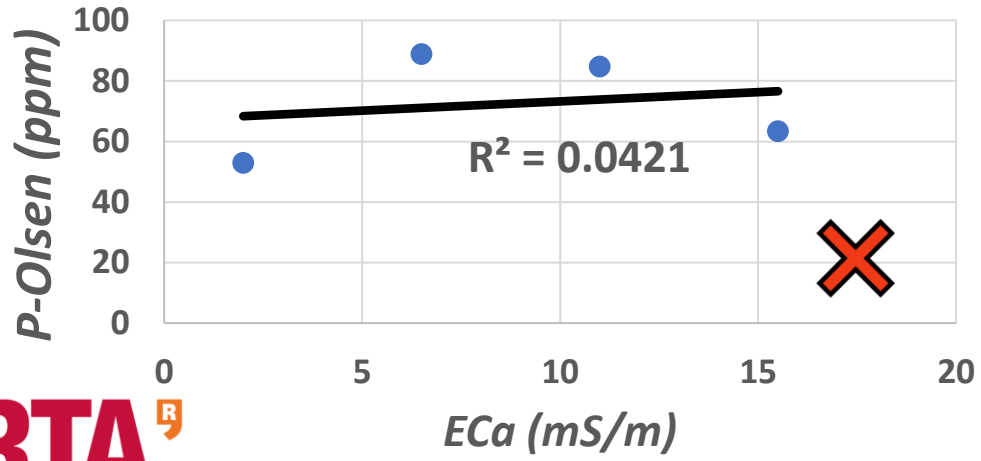



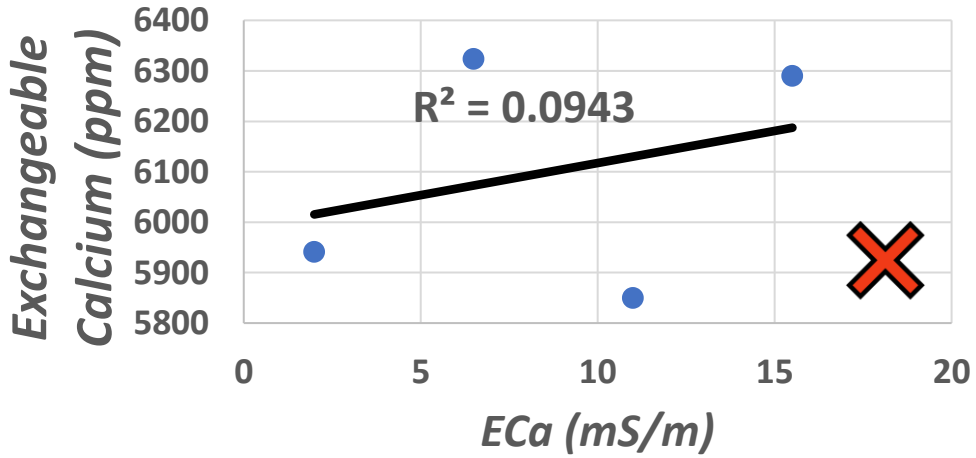



# What was observed? – 2nd plot (Ustorthent)



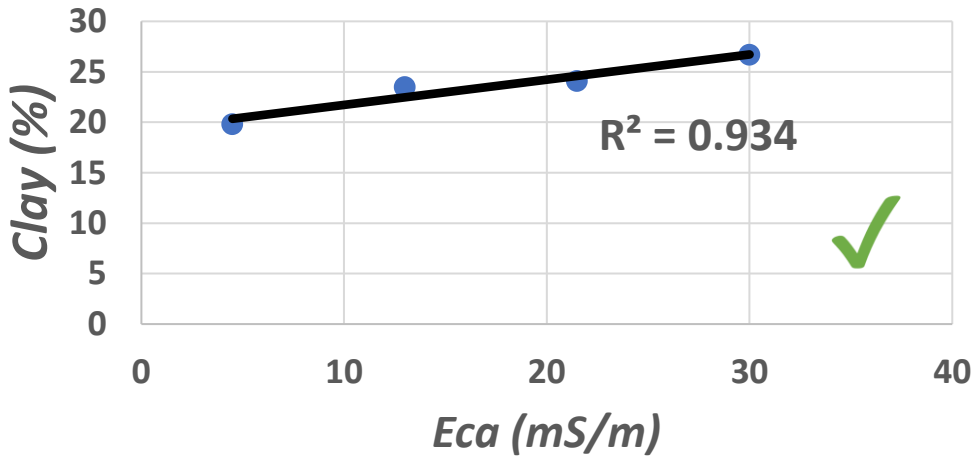



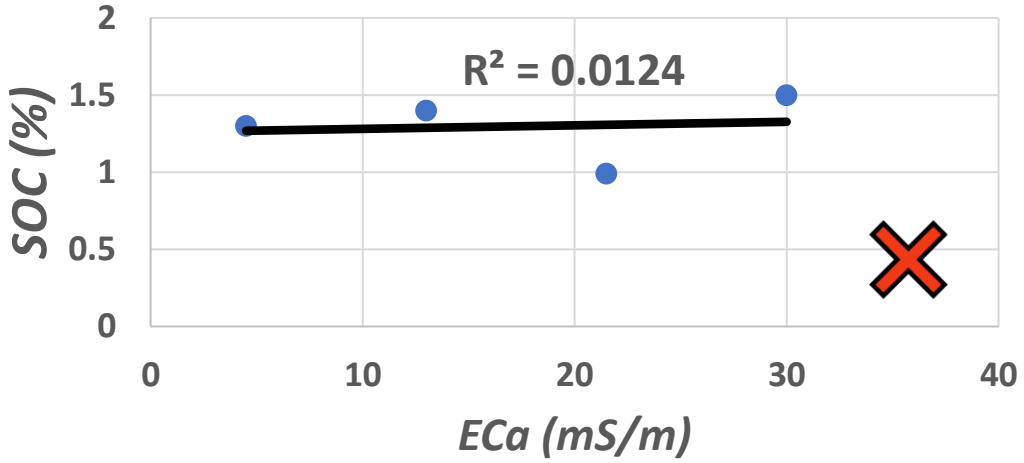



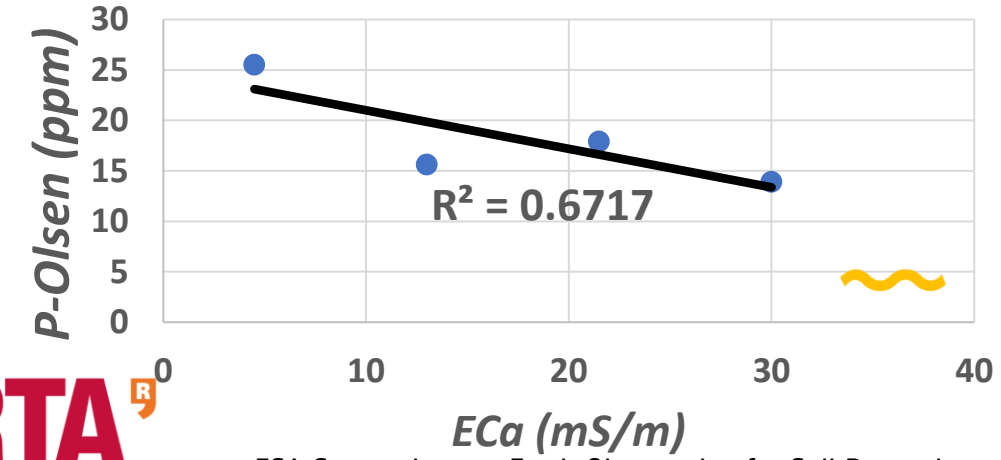



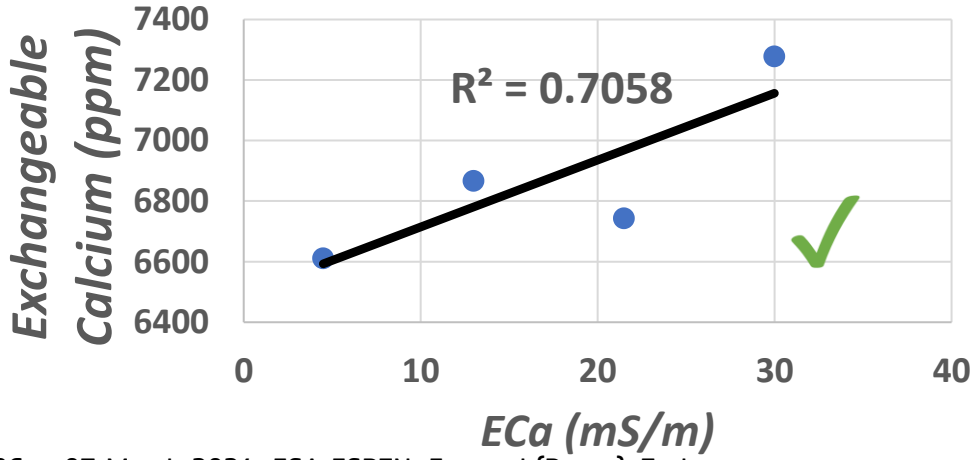

IRTA MAS BADIA

# What was observed? – 3rd plot (Xerorthent)

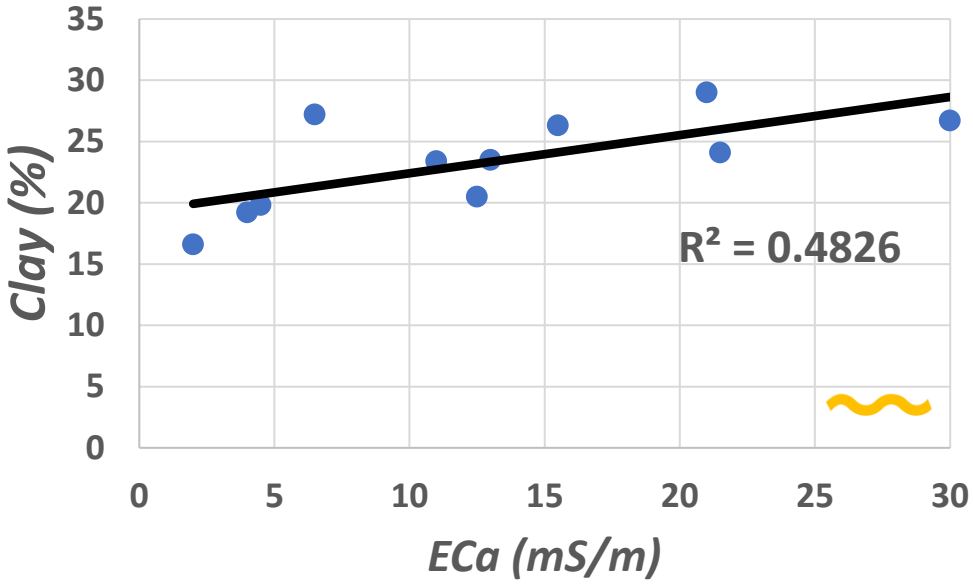


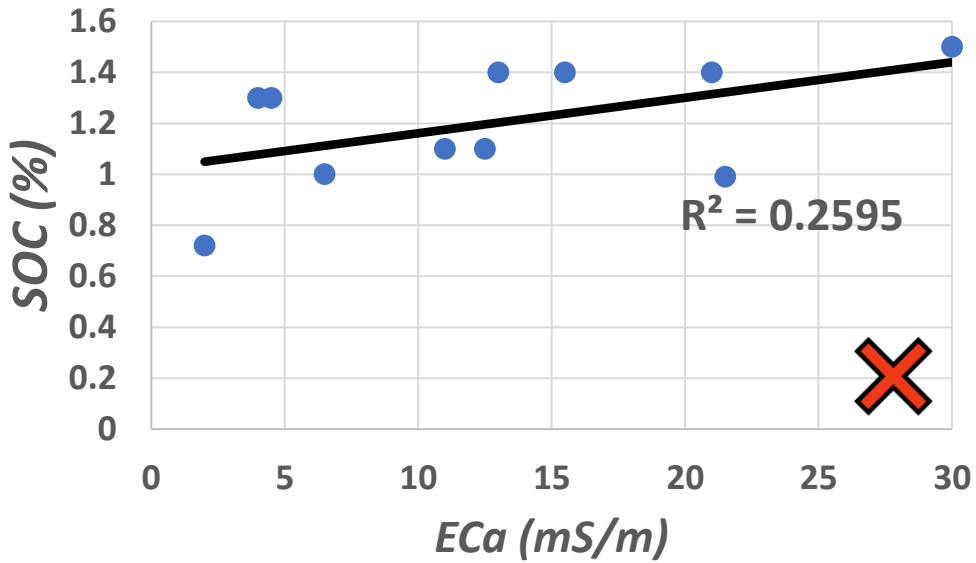



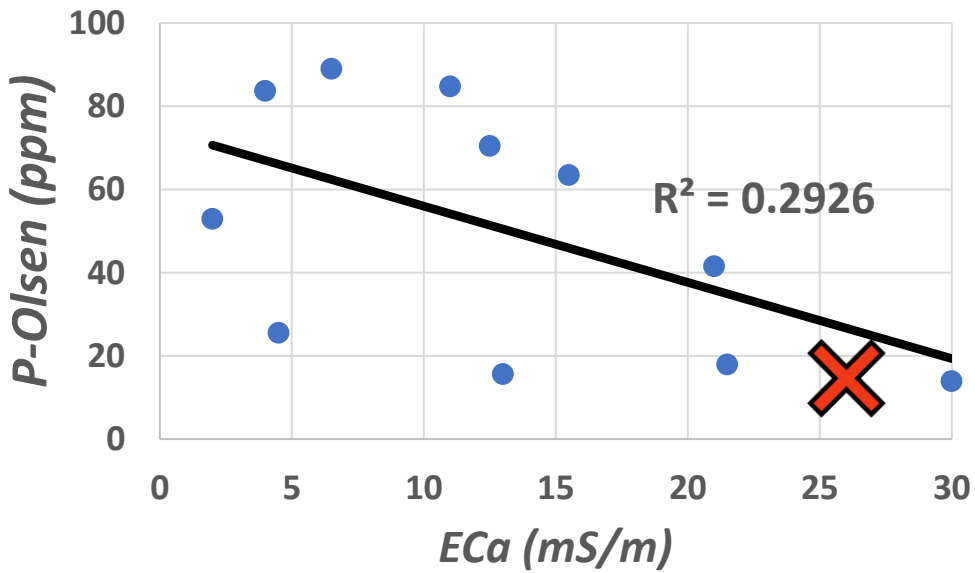
# What was observed?

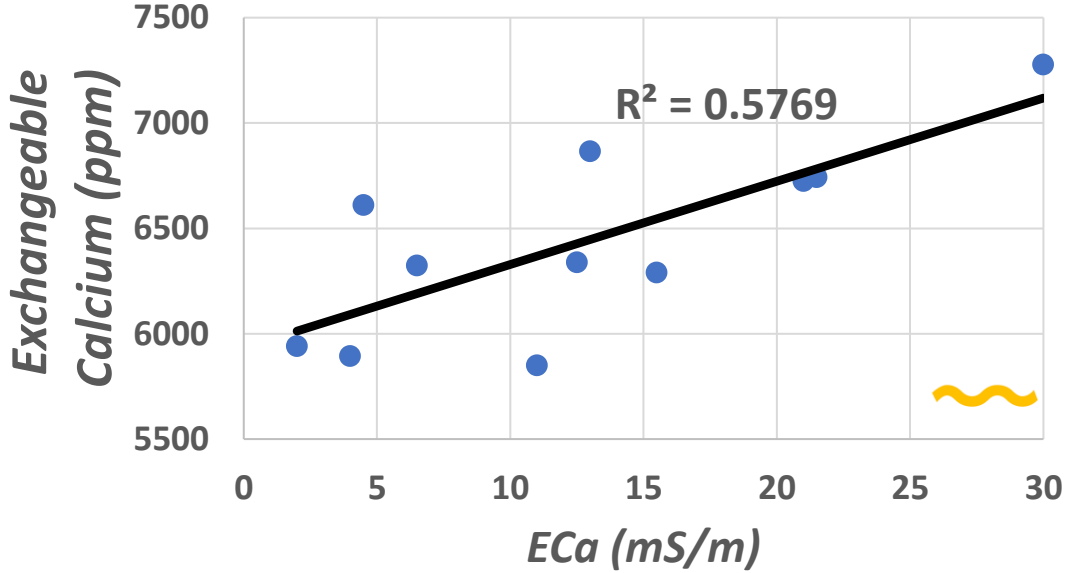



Clay content had higher values in the zones with higher ECa content. The correlation with silt and sand was less significant.
The levels of SOC did not correlate well with ECa.

# What was observed?



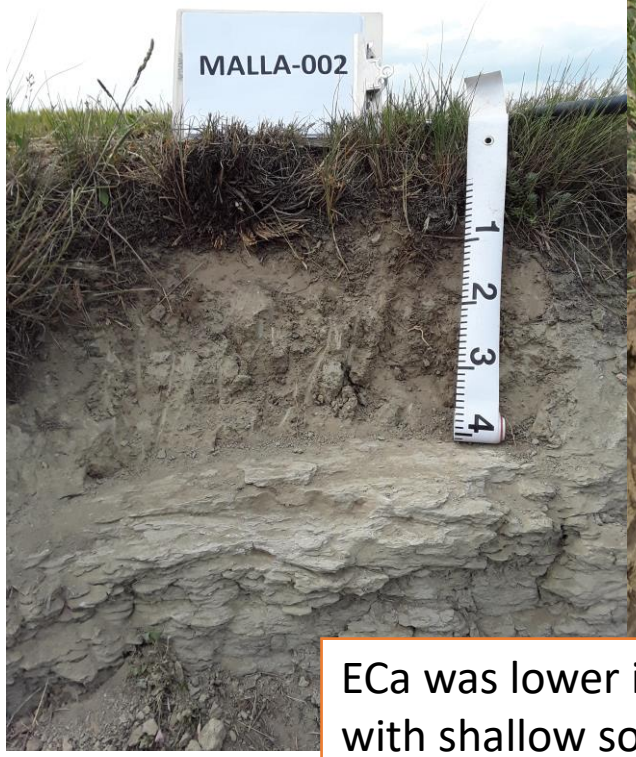




ECa was higher in the zones with higher exchangeable calcium content.
The levels of other nutrients (N, P, K, Mg and Na) did not correlate well with ECa.

# Remarks and suggestions

- Using ECa measures can help to identify the inner variability of one plot, but it isn't reliable enough to compare in-between plots.
  - The measurements of each plot must be studied separately.
  - Each zone must be characterized to determine what are the causes of the variability in each plot.
- ECa should be used paired with other technologies, such as satellite imaging to allow for better understanding of soil fertility distribution in-between the plot.

# What was observed?





ECa was lower in the zones with shallow soil.

ECa was higher in the zones with bad drainage.

# Acknowledgements

*Part of the information presented has been obtained from work that has been carried out in the framework of:*
*Plans per la millora de la fertilització agrària a les Comarques Gironines, el Vallès i Osona, finançats pel DARP-Generalitat de Catalunya*
*Grup operatiu "Agricultura de precisió per la millora de la producció i qualitat del cereal d'hivern i la seva sostenibilitat" (Operació 16.01.01 de Cooperació per la innovació del Programa de Desenvolupament Rural de Catalunya 2014-2020)*

IRTA
MAS BADIA

"WE SHARE OUR SCIENCE TO FEED THE FUTURE"