

Indicators of Sustainable Vineyard Soil Management: Metrics for Assessing Environmental Impacts



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AGROALIMENTARIA DE ARAGÓN



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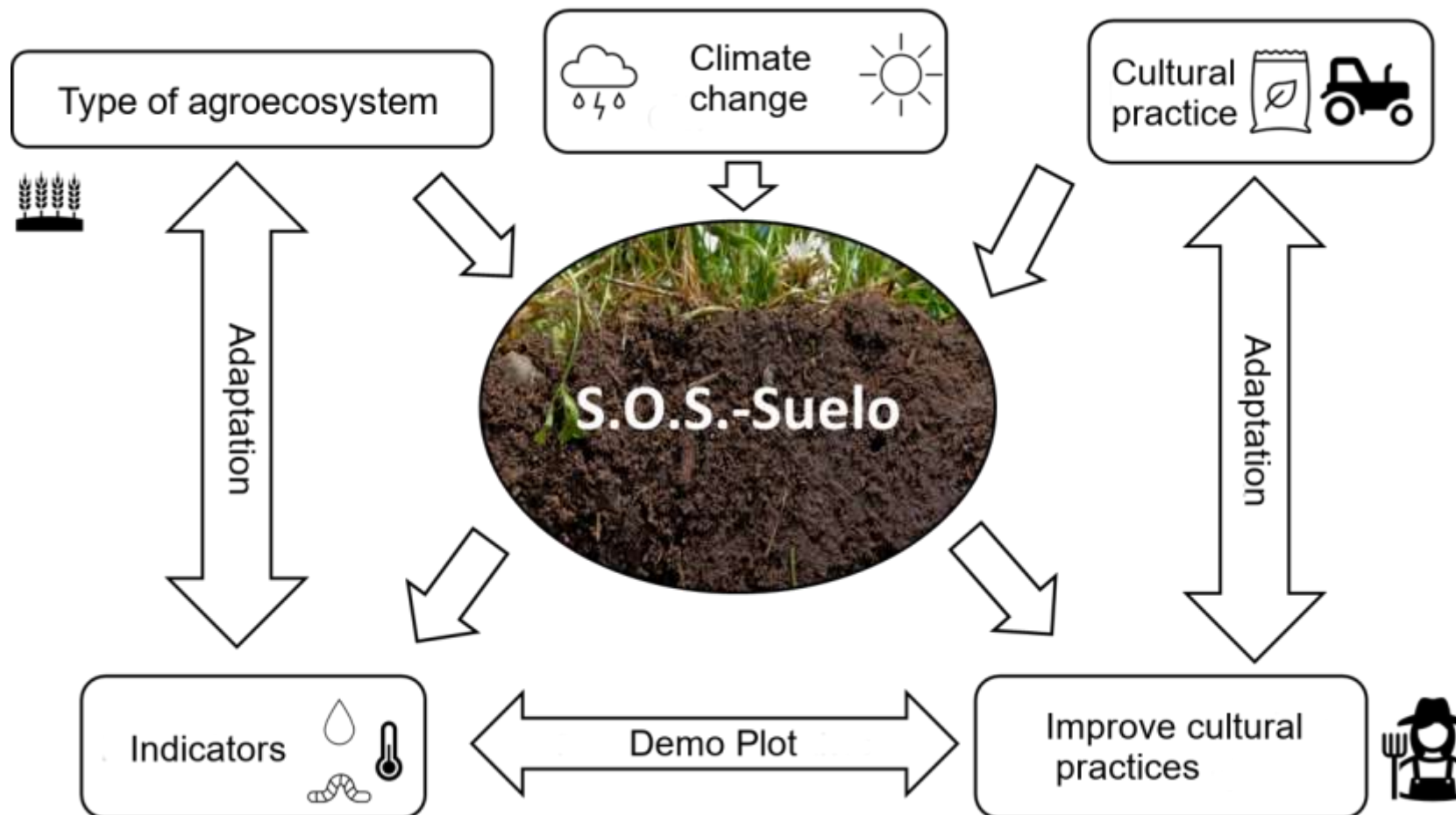


GOBIERNO
DE ESPAÑA



Plan de Recuperación,
Transformación
y Resiliencia

Principal objective



Promote the use (and generalization) of sustainable soil management practices in agroecosystems to improve or maintain soil quality.

Finding the most relevant indicators

Web of Science /Google “soil quality”, “soil health”, “soil health indicators”

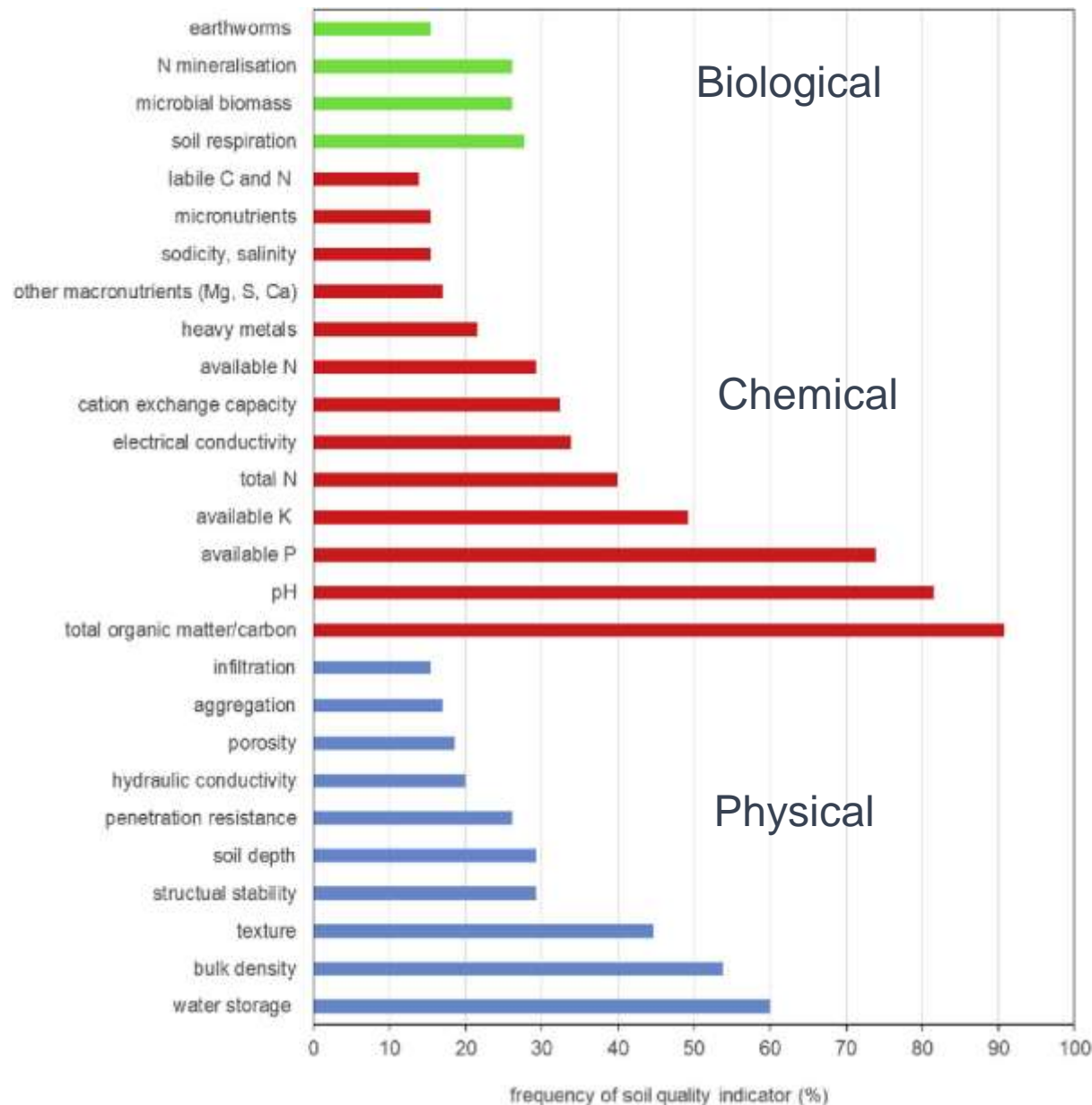
600.000 articles

100+ documents, including scientific articles, technical manuals, and examples of soil health cards.

Frequency of indicators (at least 10%) in the revised soil quality assessments (n=65).

SMAF method (Soil Management Assessment Framework):

1. Selection of indicators
2. Interpretation
3. Integration in one unique value (SQI = 0 – 10)



Selection of indicators for simple soil quality/health diagnosis

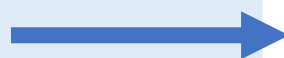
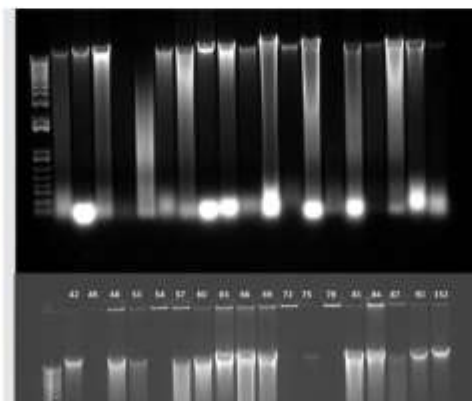
Selected Indicators	Type
Texture	Characterization and interpretation
pH (soil acidity - alkalinity)	
Percentage of soil covered by vegetation and/or presence of surface crust	
Water infiltration time	Physical soil quality
Soil structure	
Compaction/Penetration resistance	
Presence of indicator plants for salinity or waterlogging	
Organic matter/soil color	Chemical soil quality
Carbonates	
Roots (general condition and depth)	Biological soil quality
Earthworms (number of individuals)	
Macrofauna diversity	

The screenshot shows the 'Sos-suelo' website interface. The navigation bar includes 'Proyecto', 'Objetivos', 'Equipo', 'Metodología', 'Documentos', 'Noticias', and 'Contacto'. Below the navigation, there are filters for 'VER TODO', 'ARTÍCULOS TÉCNICOS O DIVULGATIVOS', 'AUDIOS', 'ENTREGABLES', 'PRESENTACIONES', and 'VIDEOS'. The main content area displays a grid of video thumbnails with the following titles:

- Video divulgativo del proyecto AGROALNEXT SOS Suelo: indicadores biológicos de salud del suelo
- Video divulgativo del proyecto AGROALNEXT SOS Suelo: indicadores físicos de salud del suelo
- Video divulgativo del proyecto AGROALNEXT SOS Suelo: indicadores químicos de salud del suelo
- Video divulgativo del proyecto AGROALNEXT SOS Suelo: indicadores...
- Video divulgativo del proyecto AGROALNEXT SOS Suelo: indicadores...
- Video divulgativo del proyecto AGROALNEXT SOS Suelo: indicadores...

Advanced Indicators

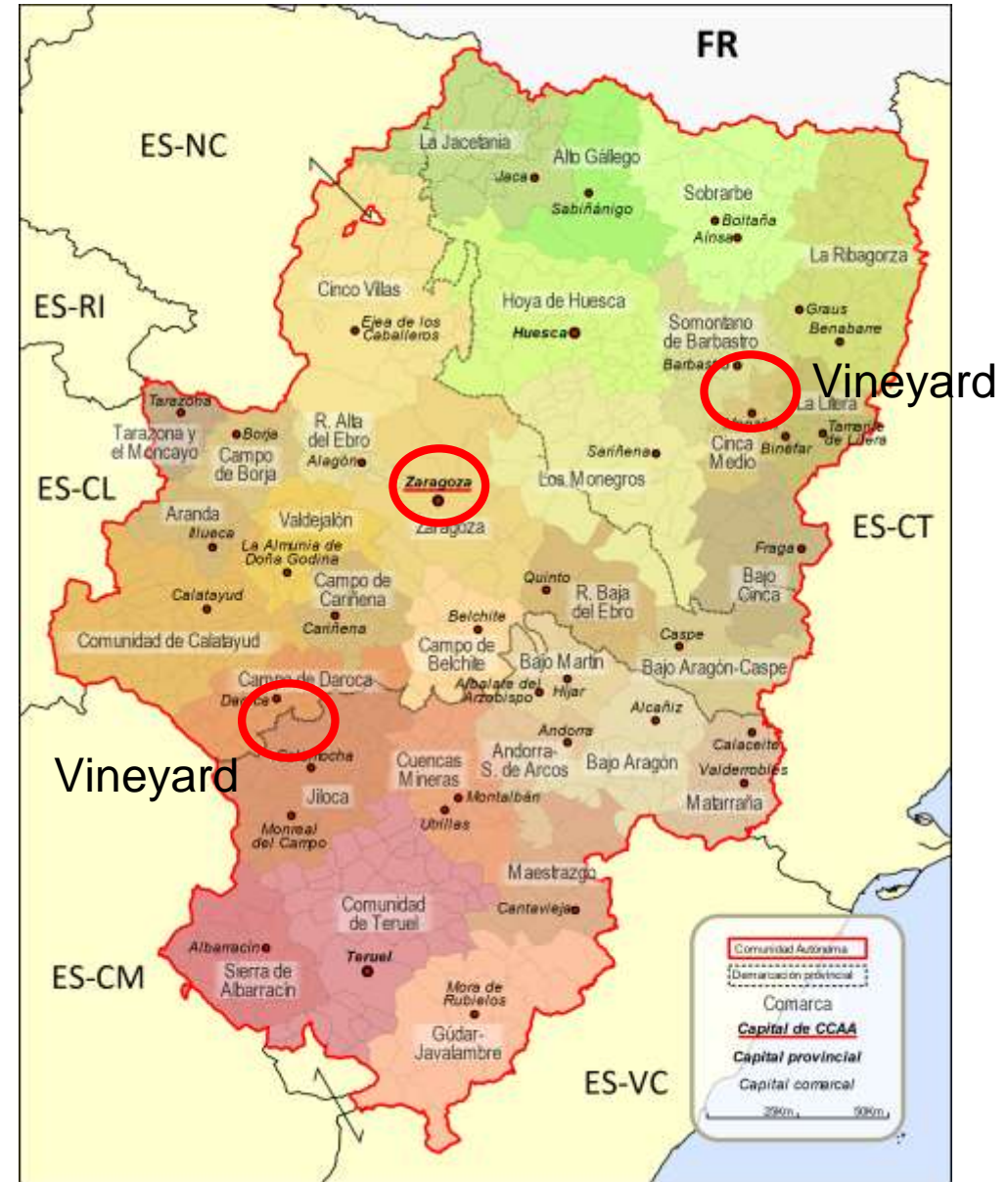
Selected Indicators	Type
Texture	Characterization and interpretation
pH	
Percentage of active limestone	
Water stability of aggregates	Physical soil quality
Water storage capacity	
Water infiltration rate	
Structure and visual estimation of erosion	
Apparent density	
Organic carbon	Chemical
Total nitrogen	
Extractable phosphorus	
Cation exchange capacity	
Electrical conductivity	
Microbial biomass	
Metagenomics (bacterial and fungal diversity)	
Biological quality index (QBS-ar)	
Earthworms (number of individuals)	
Crop yield	Agricultural production



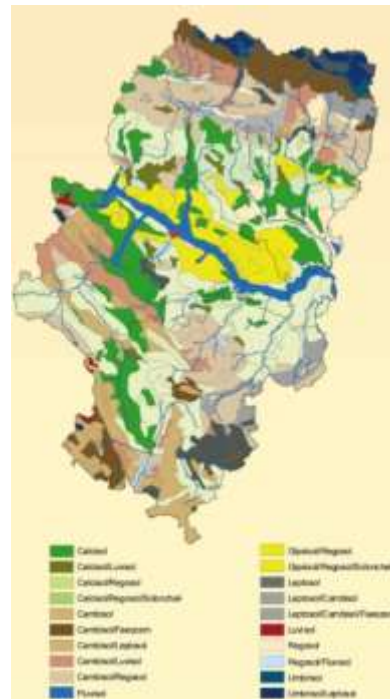
Metagenomics (DNA extraction, sequencing, bioinformatics analysis)

Selection of Plots

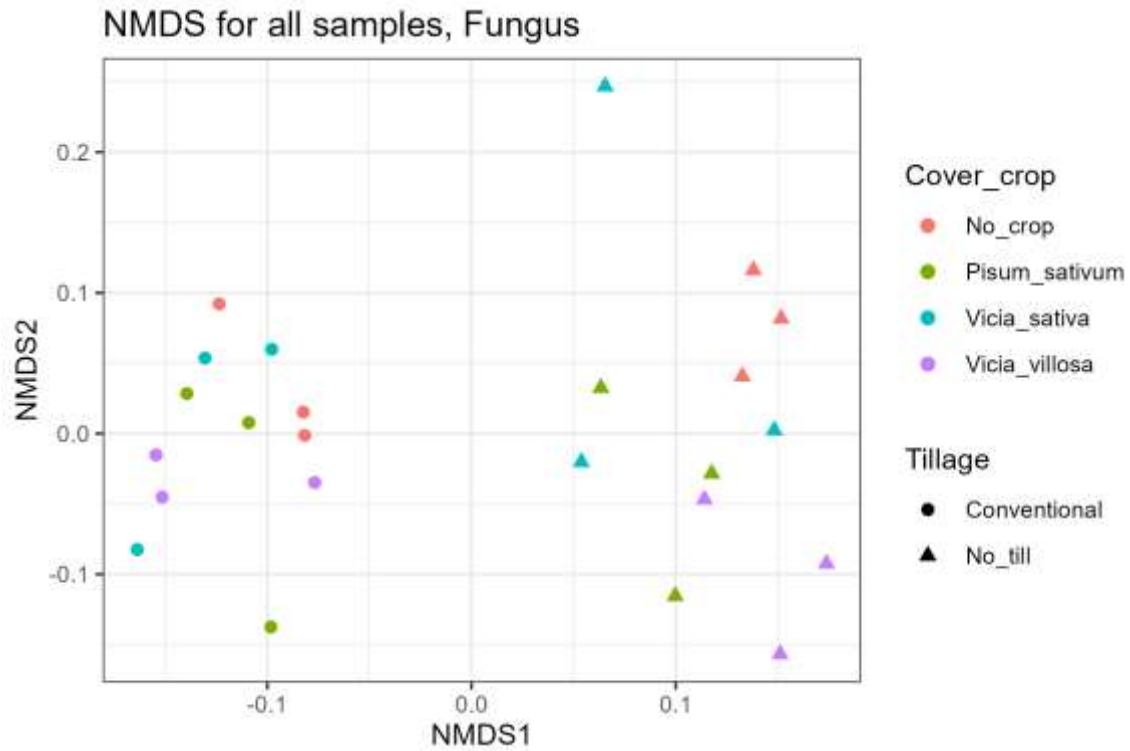
Agroecosystems
Herbaceous crops in arid areas
Herbaceous crops in semi-arid areas
Herbaceous crops in irrigated areas
Almond orchard
Olive orchard
Vineyard



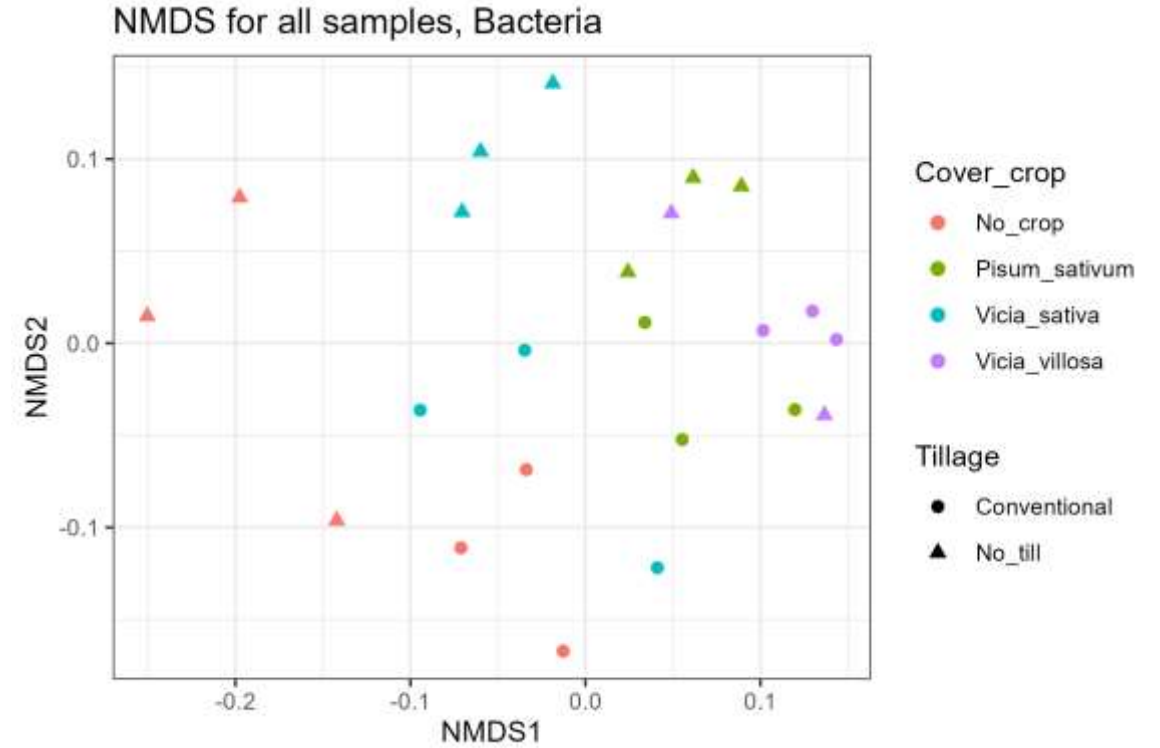
- Different management modalities:
- Conventional tillage
 - Direct seeding
 - Mulching
 - Cover crops
 - Ecological



Metagenomics Analysis Tillage and Cover crop



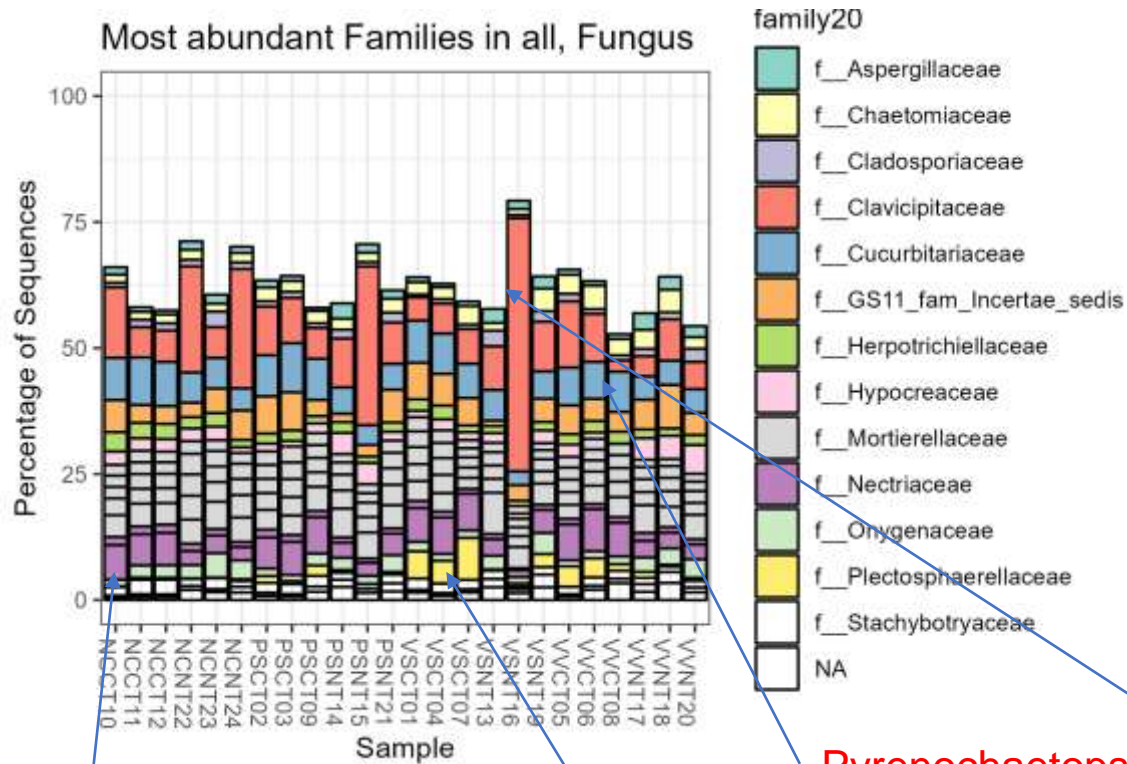
Separated by tillage



Not so clear

Metagenomics Analysis Tillage and Cover crop

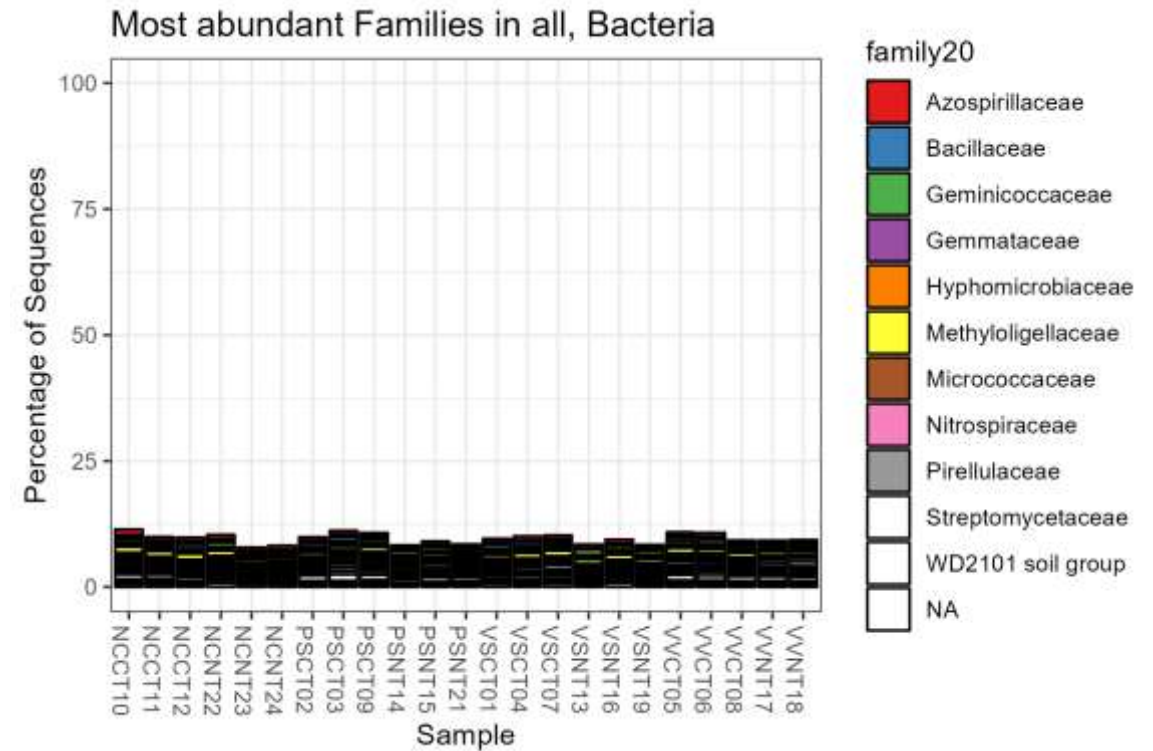
The top 20 families confirmed the alfa diversity



Fusarium equiseti
week pathogen of cereal
CT

Gibellulopsis: induce defense mechanism against wilt CT

Pyrenochaetopsis
Pathogen, poor
knowledge CT



Metarhizium brunneum, variable but interesting, efficient against insects, used as a treatment against a bee predator

SAFMA



José Manuel Mirás Avalos



Ramón Isla Climente



Farida Dechmi



Vicente González García



Emily Silva Araujo



Inés Zugasti López

Ciencia Vegetal



Jérôme Grimplet



Pedro Marco Montori



María José Rubio Cabetas



Sergio Sánchez Durán



Sergi García Barreda

