

# Azienda Baroncina – Lodi

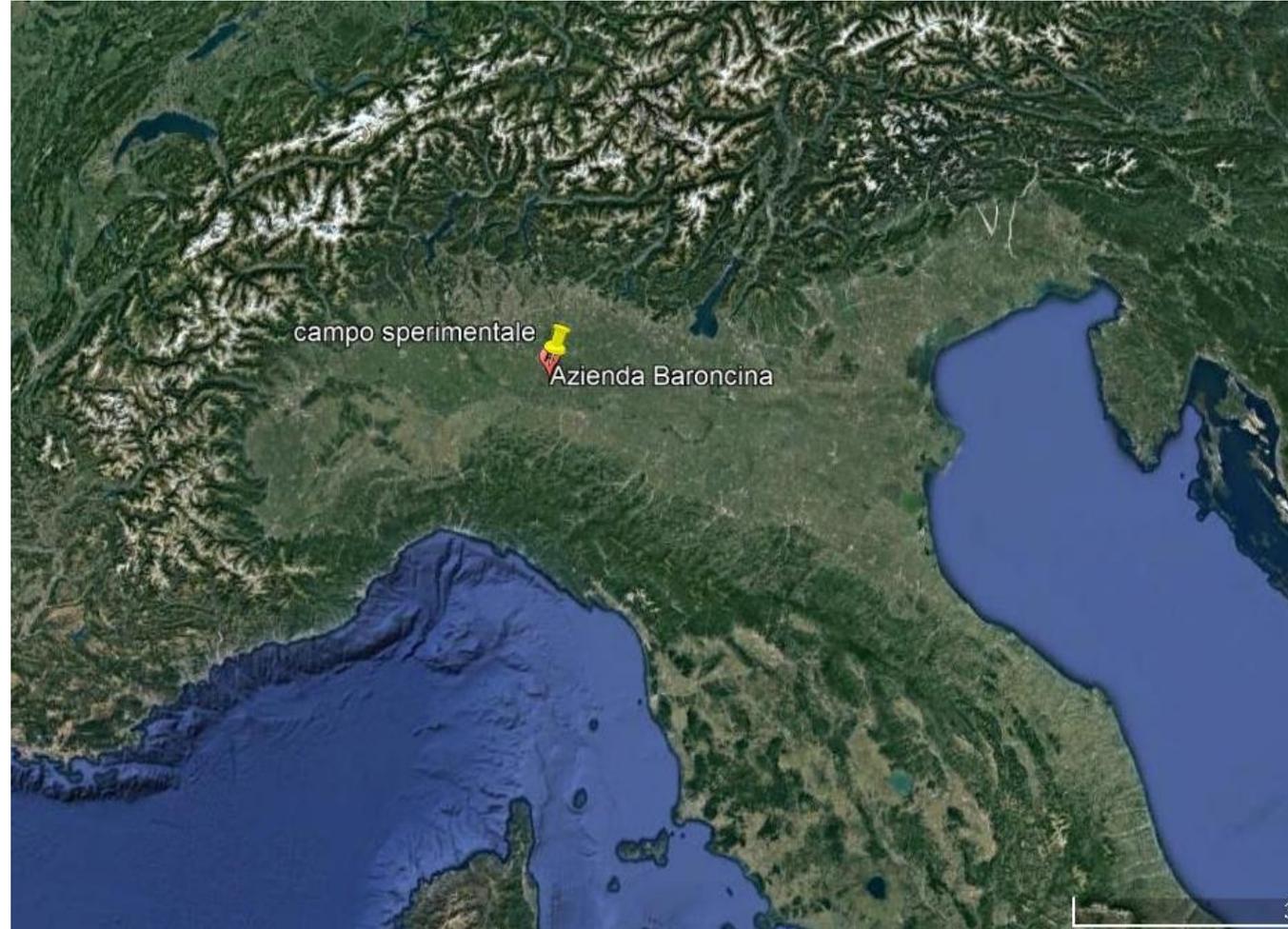
## EXPERIMENT GOALS

To assess in a long term perspective the effectiveness of the biochar soil amendment in cereal-forage crops, in terms of:

- soil carbon sequestration and soil fertility;
- Positive interaction with slurry and digestate;
- Reduction of greenhouse gas emissions;
- Reduction of nutrient leaching.

## DURATION OF THE EXPERIMENT

Started on 2017 - **ongoing**



## **SITE DESCRIPTION AND EXPERIMENTAL TREATMENTS**

The field experiment is by Azienda Baroncina - CREA-ZA Lodi (Lat. 45°25'25.38"N; Long. 9°29' 49.59"E; 0 m. a.s.l.). The experimental site has been the subject of a twenty-year experiment for the use of bovine manure.

The cultivation system adopted is typical of the Po Valley: annual double crop Italian ryegrass+silage maize; in 2020 an experimental field with alfalfa and tall fescue was introduced. The soil is a shallow acids sandy-loam textured (USDA, 2005), with less than 2% of organic matter and potassium deficiency (F.A.O. classification: GleyicLuvisols).

The experiment annual rotation (Italian ryegrass+silage maize) consists of 4 control treatments (traditional chemical application, liquid manure, digestate, no treatment) and 24 experimental treatments with biochar: 2 different biochar, 4 application methods (alone and in association with chemical, liquid manure, digestate), 3 biochar application rates (10-20-40 ton d.m. ha<sup>-1</sup>). Biochar application was done only once, in 2018 (incorporating by plowing at 0.3 m. depth), while chemical, liquid manure and digestate repeated every year before sowing mais. Each treatment has been replicated twice.

For the alfalfa and tall fescue experiment, in 2020 biochar was incorporated at 0.3 m. depth, alone and together with digestate; 2 control treatments has been planned: digestate and no treatment.

## **BIOCHAR DESCRIPTION**

Biochar 1: GLM SRL (Mantova – Italy), produced with autochthonous wood through a pyro-gasification process at temperature of 750°C (yield: 10% on biomass).

Biochar 2: Eccosoluzioni SRL (Como – Italy), produced with autochthonous wood through a pyrolysis process at temperature of 400°C (yeld: 30% on biomass).

Both Biochar were analyzed for physical-chemical parameters provided for national legislation (contaminants and bioassays included).

## MEASURED PARAMETERS

**Field conditions:** meteorological data (rainfall, irrigation and temperature).

**Physiological and Production data:** growth and reproductive development, quality and quantity production.

**Soil analysis and interactions with biochar:** annual soil analysis for the main physical-chemical parameters and soil biological index, soil carbon content in total and stable forms (at the end of corn cultivation).

**Greenhouse gas emissions:** CO<sub>2</sub>, N<sub>2</sub>O and CH<sub>4</sub> emissions during corn cultivation (from 2020 also in alfalfa).

**Nutrients leaching:** mineral nitrogen and phosphorus intercepted at 0.4 m. depth (both silage maize and alfalfa).



2019, Drone Survey: NDRE Index

## PLANNED ACTIVITIES OR POTENTIAL EXPERIMENTAL ACTIVITIES

The long term field experiment of Lodi has been designed with the purpose of testing, dissemination, demonstration opportunity, both for scientific and productive community.

## PRESENTATION OF THE WORKING GROUP

The Lodi field experiment was planned and done by Fondazione Minoprio, CREA-ZA Lodi and CREA-AA Firenze and with the collaboration of Up to Farm srl Torino (2017-2019). The experiment refers to the following Regional projects:

- “Infochar” – Dimostrazione e divulgazione dell’efficiacia agronomica ed ambientale dell’uso del biochar in ambito cerealicolo-foraggero intensivo (2017-2019) – Fondo Europeo Agricolo per lo Sviluppo Rurale - PSR 2014-2020 – Operazione 1.2.01 - Regione Lombardia – Direzione Generale Agricoltura;
- “N-Control” - Riduzione delle emissioni di gas serra e ammoniaca nella filiera zootecnica (2020-2022) - Fondo Europeo Agricolo per lo Sviluppo Rurale – PSR 2014-2020 – Operazione 1.2.01 – Regione Lombardia – Direzione Generale Agricoltura.

## CONTACTS

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## LOGOS



**PSR**  
2014 2020  
**LOMBARDIA**  
L'INNOVAZIONE  
METTE RADICI



**Regione  
Lombardia**



Fondo Europeo Agricolo per lo Sviluppo Rurale: l'Europa investe nelle zone rurali