

Ultuna Biochar Experiment

59°49'34.0"N 17°39'21.5"E

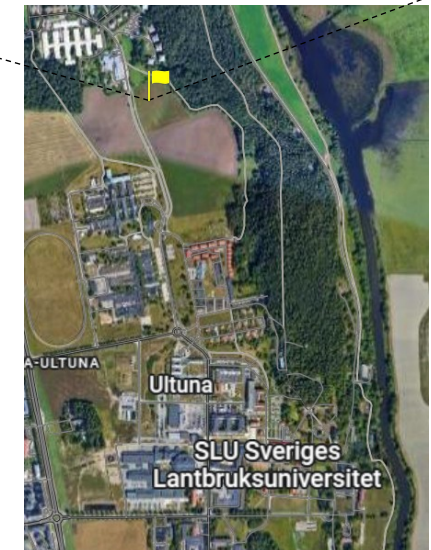
[Ultuna-Uppsala, Sweden]

EXPERIMENT GOALS

Establishment of long-term field trials with biochar in Swedish agricultural soils in order to facilitate future research and evaluation of long-term stability and effects of biochar. The effect on vegetation and soil will be investigated. The goal of the trials is to be long-term.

Duration of the experiment (expected start and end)

2023 – non expected date.



SITE DESCRIPTION

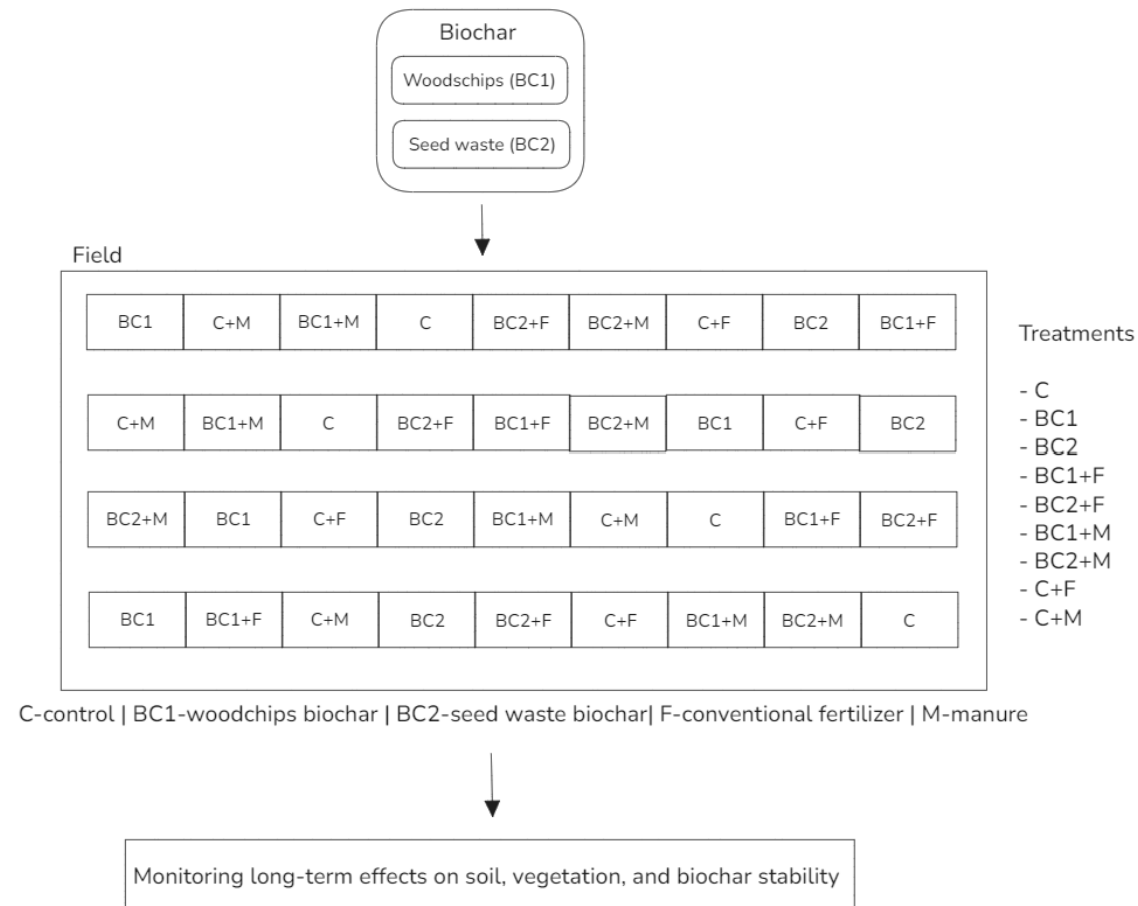
The field trial is located in Uppsala, Sweden, which has a cold temperate climate with distinct seasons and average annual temperatures around 6 °C. The soil at the site is classified as sandy, with a composition of 80.2% sand, 9.6% silt, and 10.2% clay. Soil organic carbon content is measured at 1.4%, indicating a low to moderate carbon level typical of agricultural soils in the region. The soil is moderately acidic, with a pH of 5.03. Barely was planted in the field trial.

BIOCHAR AND ITS APPLICATION IN THE FIELD

Two types of biochar were used in the trial, produced from different biomass feedstocks:

- *Woodchips sourced from Kinnekulle*
- *Seed waste sourced from Skånefrö*

Both feedstocks were dry prior to pyrolysis. Specific details regarding production temperature and pyrolysis conditions are not available. Biochar was applied once in 2023 at a rate of 8 tonnes per hectare for each type of biochar.



MEASURED PARAMETERS

AIR

- *No measurements of air quality or particulate matter are currently in place.*
- *Carbon fluxes (e.g. soil respiration) may be included in future assessments.*

WATER

- *Soil moisture and water balance are monitored using in situ soil sensors.*
- *No leachate collection or water sampling is currently being conducted.*

SOIL

- *Baseline soil analysis (T_0) has been conducted, including pH (5.03), texture (80.2% sand), and organic carbon content (1.4%).*
- *Soil sensors continuously measure:*
 - *Moisture (%)*
 - *Temperature (°C)*
 - *Salinity (dS/m)*
 - *Water balance*
- *No data currently available on biochar degradation, mineralization rate, or carbon stabilization.*
- *Periodic sampling planned for long-term monitoring of biochar-soil interactions.*

OTHER

- *Field conditions (rainfall, temperature) are recorded using external meteorological data from the Uppsala region. Other production parameters: agro-phenological data, resistance to pathogens,*

PLANNED ACTIVITIES OR POTENTIAL EXPERIMENTAL ACTIVITIES

- *Placement of soil sensors in the field trial*
- *Measurement of N₂O emissions + soil sampling*

PRESENTATION OF THE WORKING GROUP

This long-term biochar field trial is carried out by a multidisciplinary team of researchers from the Swedish University of Agricultural Sciences (SLU), bringing together expertise in bioenergy systems, soil science, biogeochemistry, and environmental risk assessment. The group is actively engaged in investigating the impacts and benefits of biochar on agricultural systems, with a focus on soil health, carbon dynamics, and sustainable land management.

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The project is funded by the Swedish Energy Agency

Bibliography

Biochar systems: <https://biochar.systems/>

SLU Biochar network: <https://www.slu.se/en/slu-biochar>

