

Can the conversion to perennial cereal crops simultaneously promote SOC formation and stimulate microbial N-mining?

Xiaojing Yang^{a,b}, Lettice C. Hicks^{a,b}, Albert C. Brangari^{a,b,c}, Johannes Rousk^{a,b}

^aMicrobial Biogeochemistry in Lund (MBLU), Lund University, Sweden

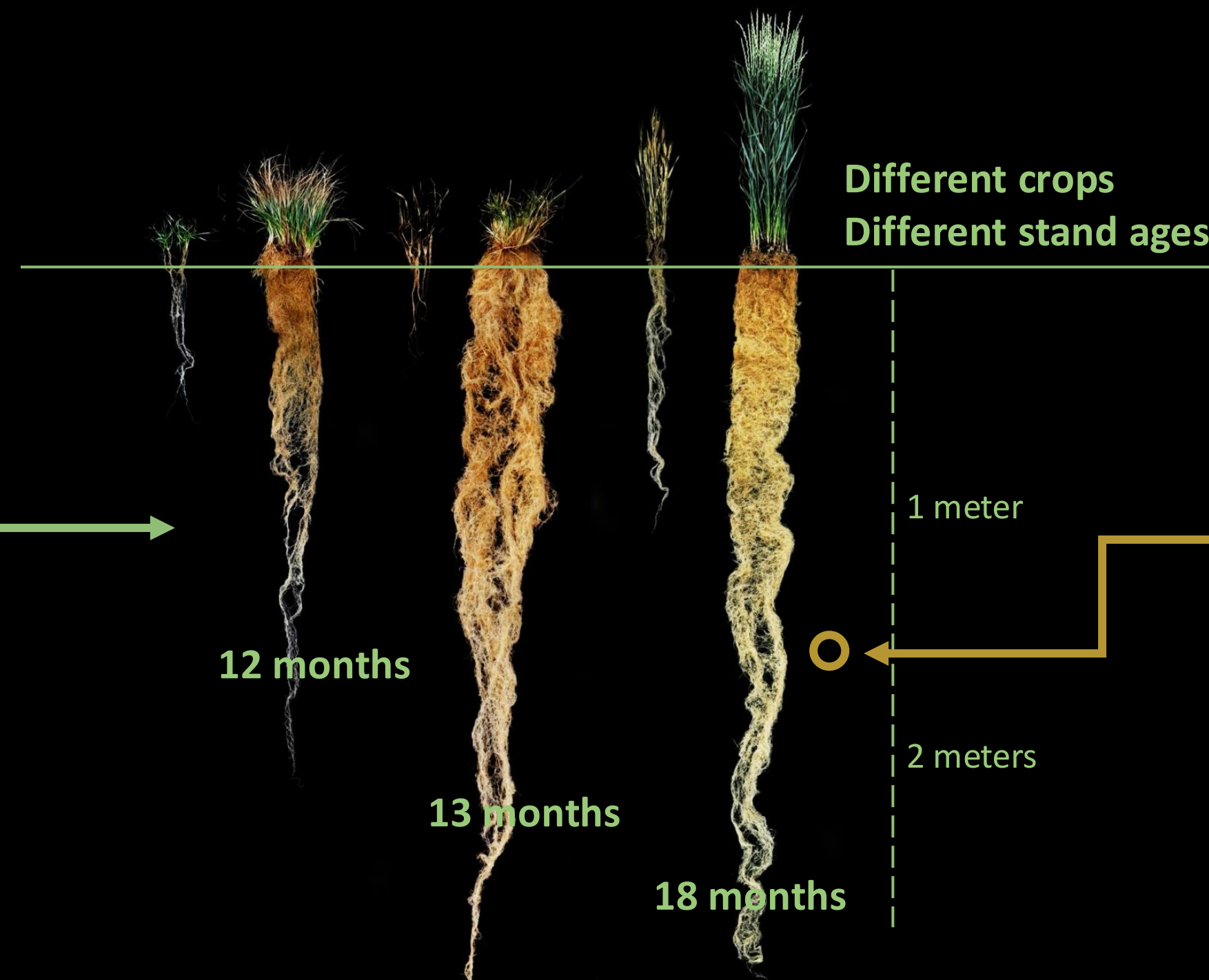
^bMicrobial Ecology, Department of Biology, Lund University,

^cDepartment of Ecosystem and Landscape Dynamics, University of Amsterdam, The Netherlands

1. BACKGROUND

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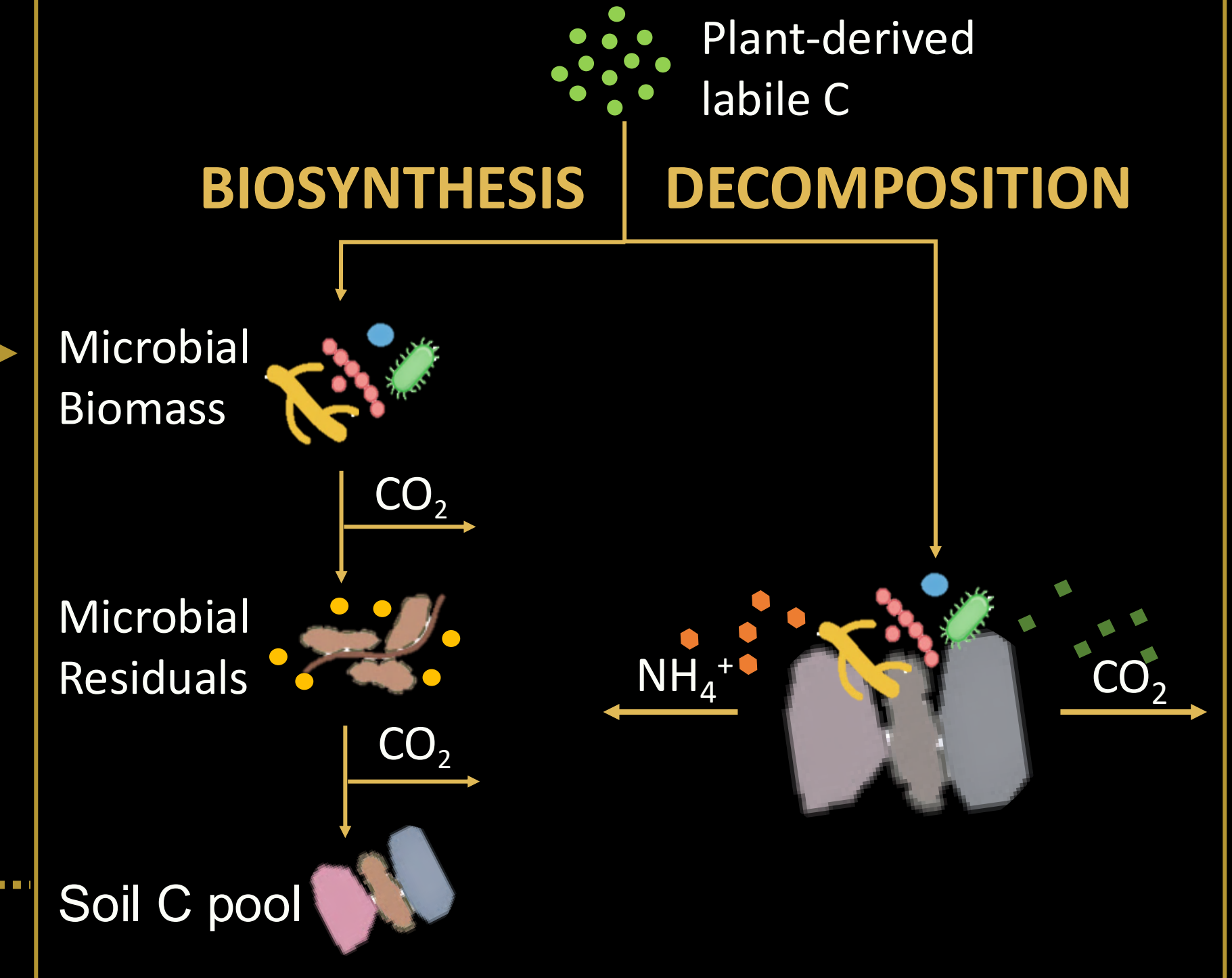
- Originated from Intermediate wheatgrass (*Thinopyrum intermedium* (IWG))
- Perennial cereal crop
- Deep-rooted
- Not annual tillage



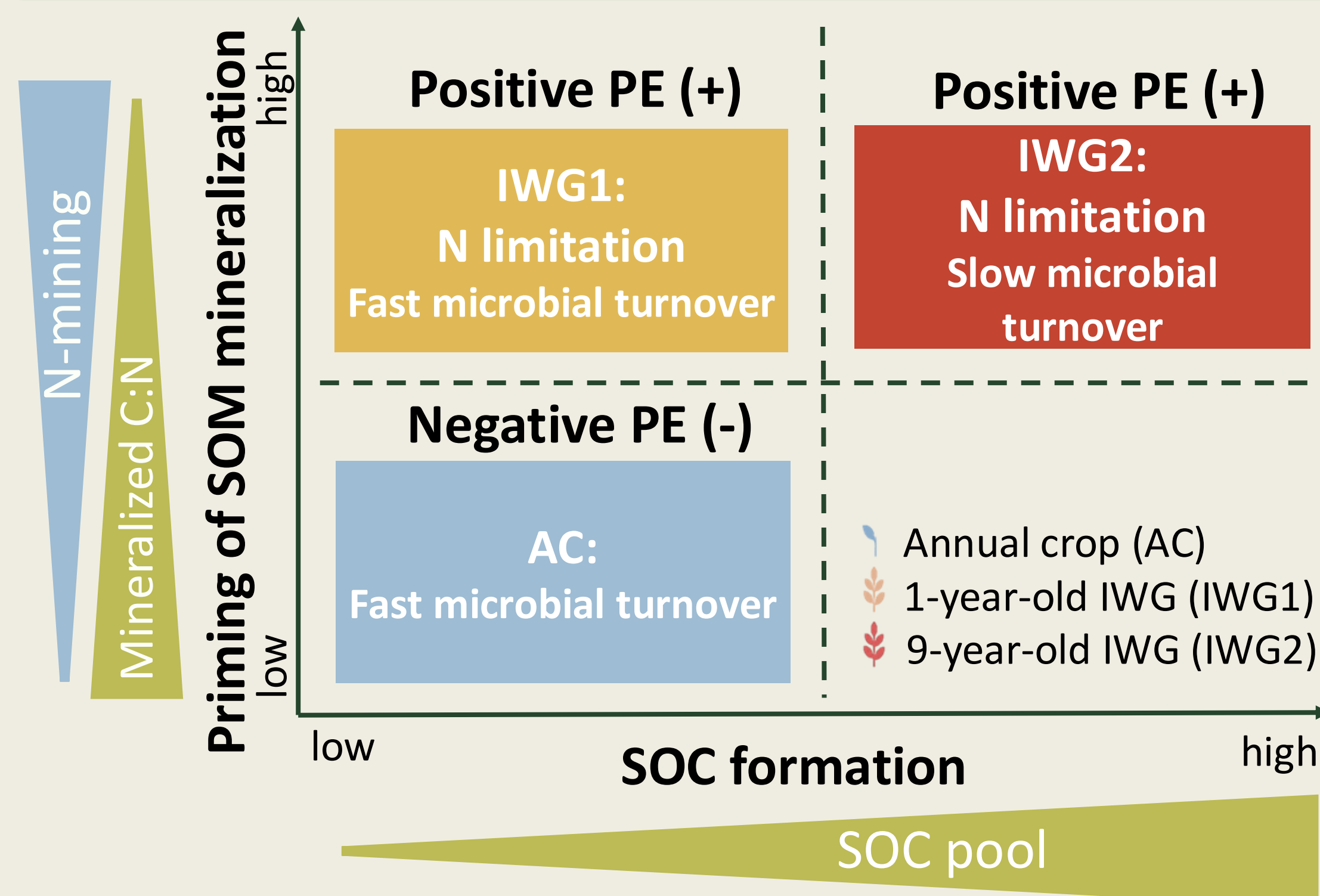
CARBON SEQUESTRATION & NUTRIENT PROVISION

IWG might promote the C sequestration and trigger the priming effect (PE) of SOM mineralization

MICROBIAL FUNCTIONS



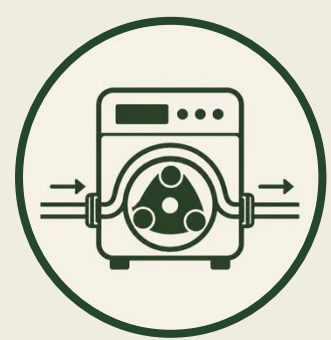
2. HYPOTHESIS



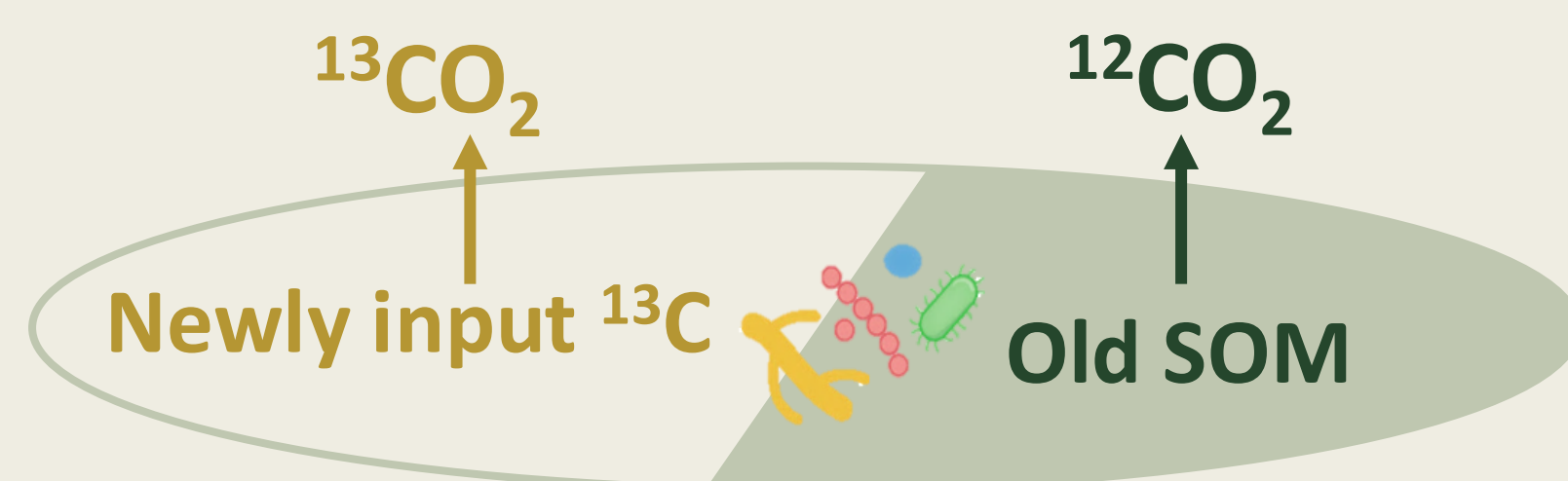
3. METHODS

Semi-continuous addition of ¹³C-glucose to simulate plant-C input

- Low C concentration: 8 ug C/g fwt. soil/day
- High C concentration: 40 ug C/g fwt. soil/day



SOC mineralization: Picarro measurement



SON mineralization: ¹⁵N pool dilution method

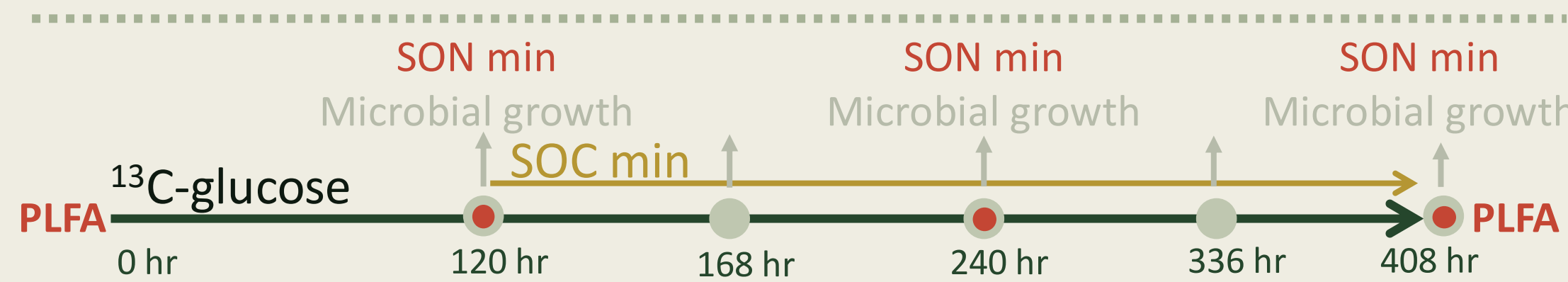


Microbial growth rate: radioactive tracer

- ³H leucine into bacterial protein
- ¹⁴C acetate into fungal ergosterol

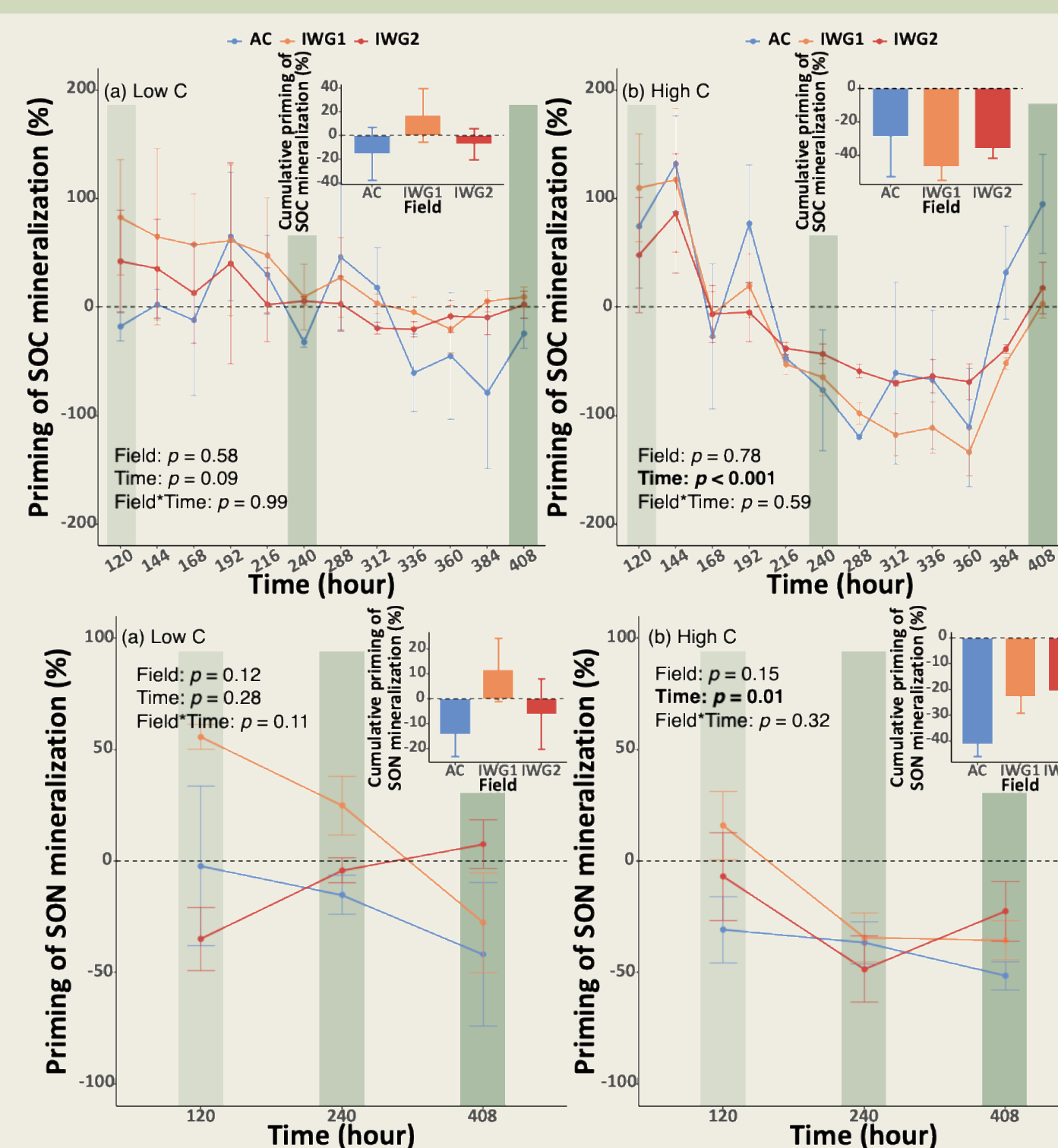
Microbial community structure: PLFA

Microbial turnover rate: growth rate/ biomass



4. PRELIMINARY RESULTS

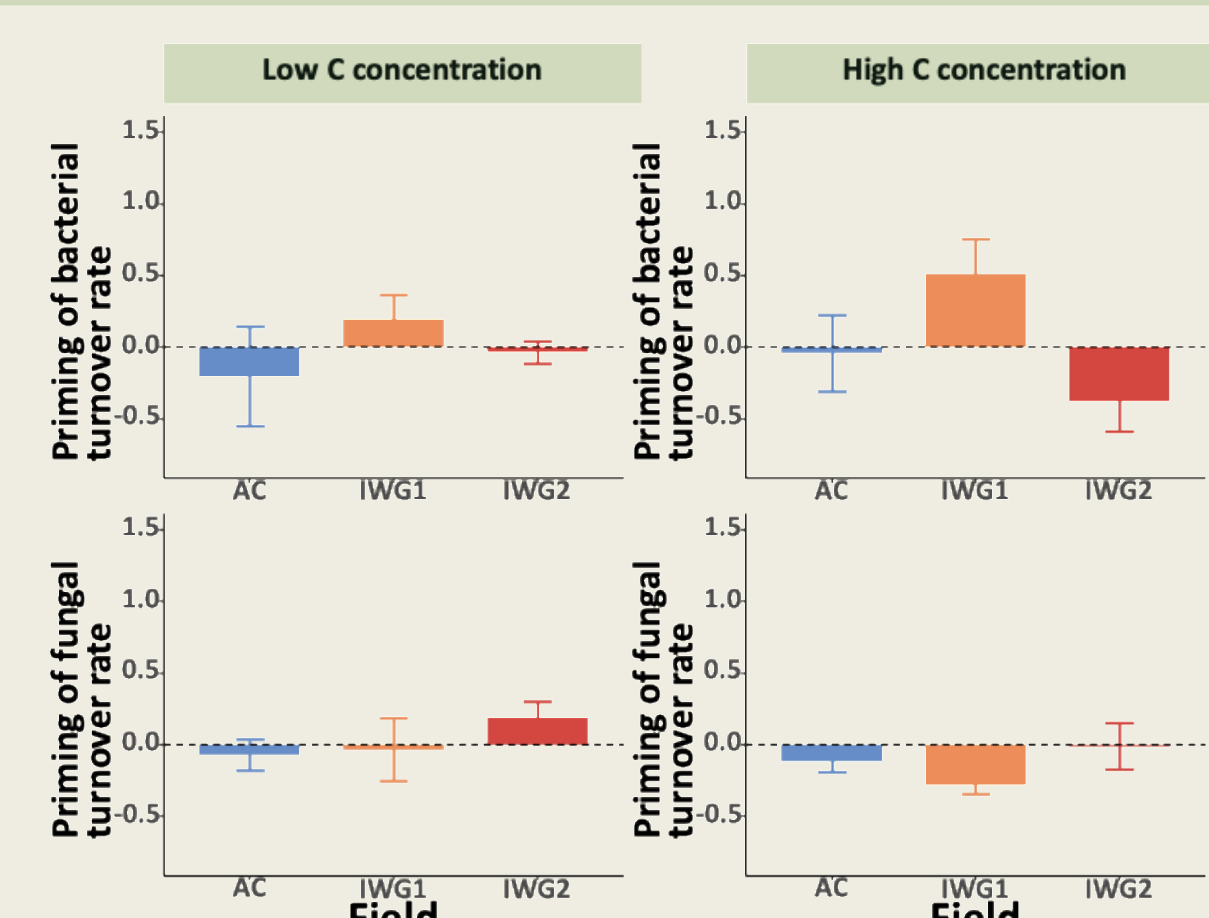
Priming of SOM mineralization



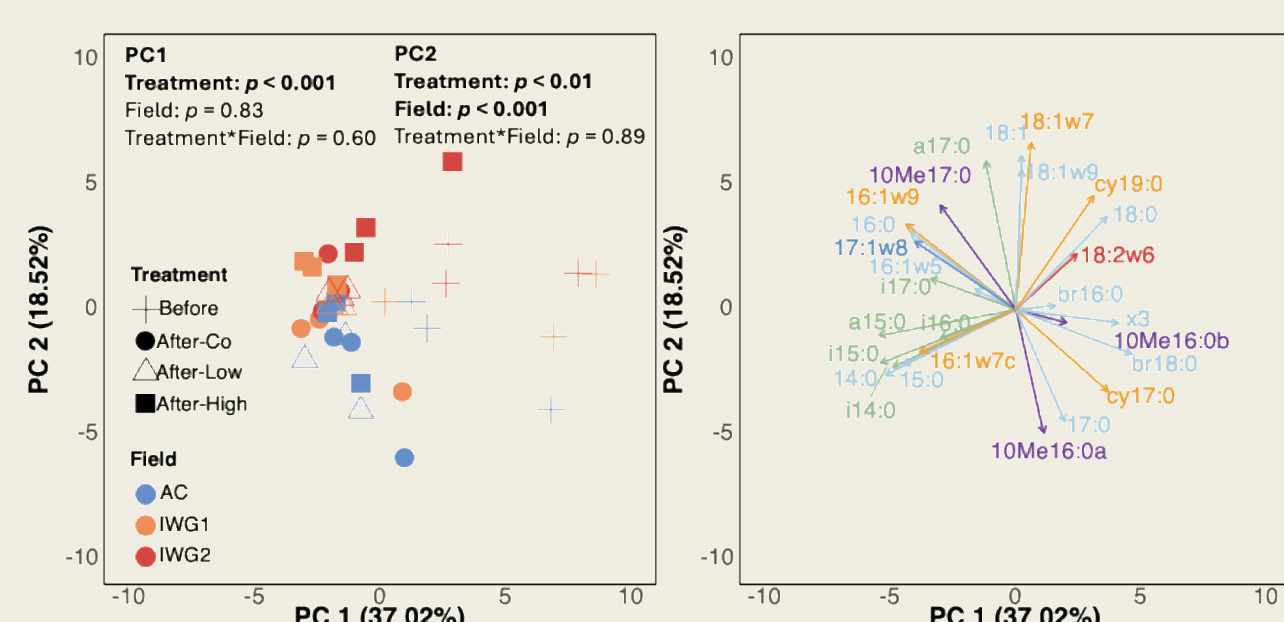
Under AC:

- Negative priming of mineralization along the C gradient
- Priming of bacterial growth without N mining at high C

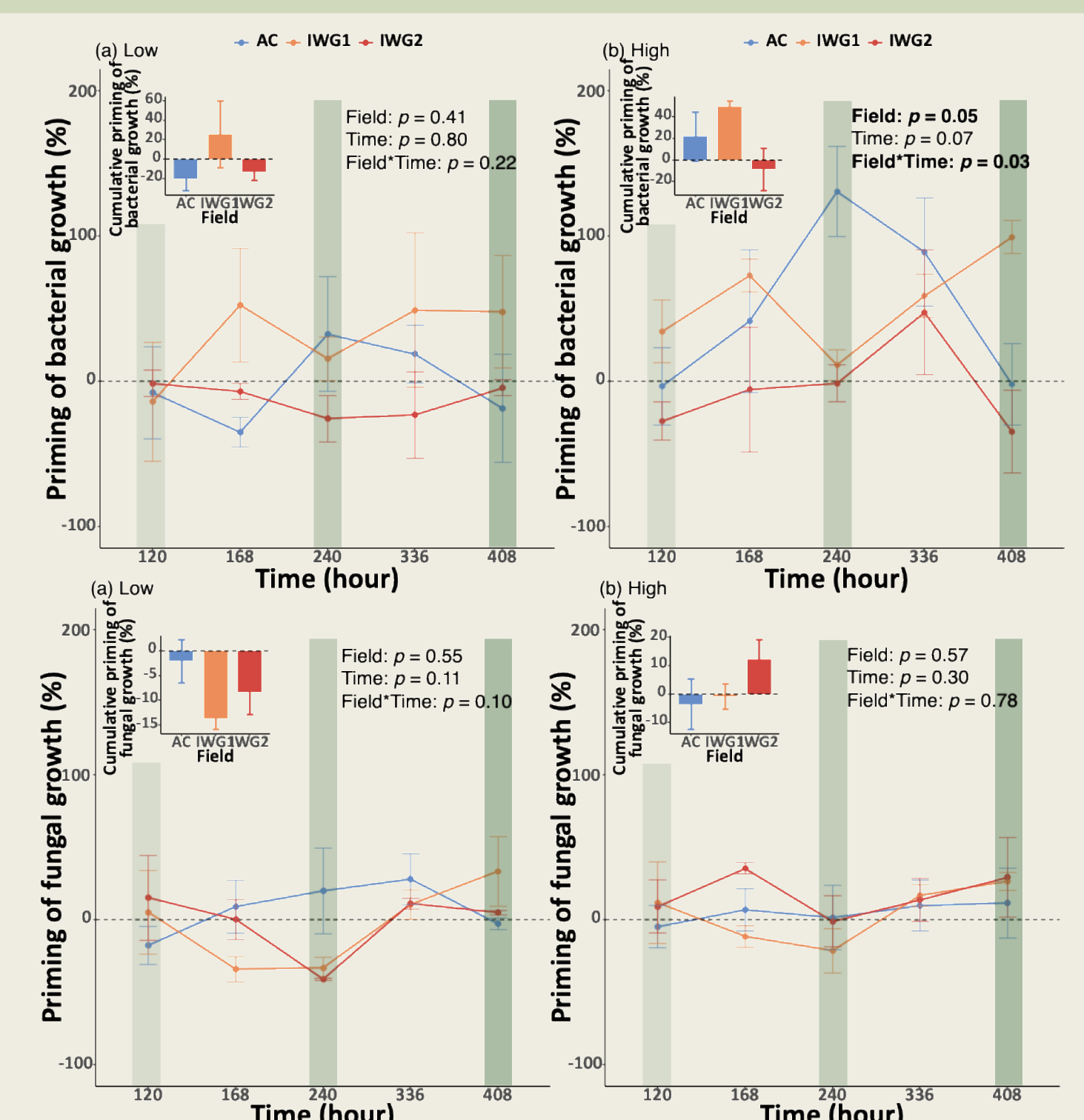
Priming of microbial turnover rate



Microbial community structure



Priming of microbial growth



Under IWG1:

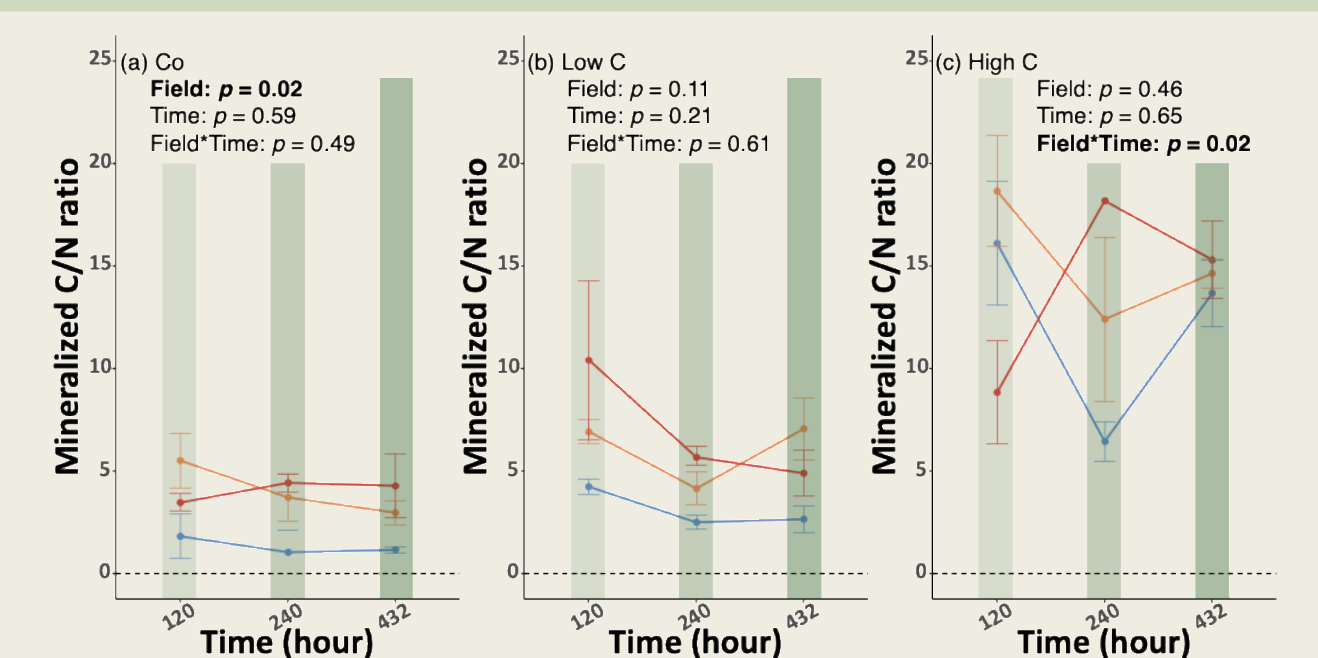
- Priming of bacterial growth with N mining at low C
- Priming of bacterial growth without N mining at high C

Under IWG2:

- Negative priming of mineralization along the C gradient
- Priming of fungal growth without N mining at high C

Priming responses of microbes along the C gradient suggest preferential substrate use

Mineralized C/N ratio



	AC	IWG1	IWG2
SOC (%)	27.7	26.6	30.2
NH ₄ -N (ug/g)	0.39	0.58	0.05
pH	7.6	6.5	6.6

5. TAKE-HOME

Perennial conversion did *not* cause labile C to induce N mining; instead it reduced N availability.