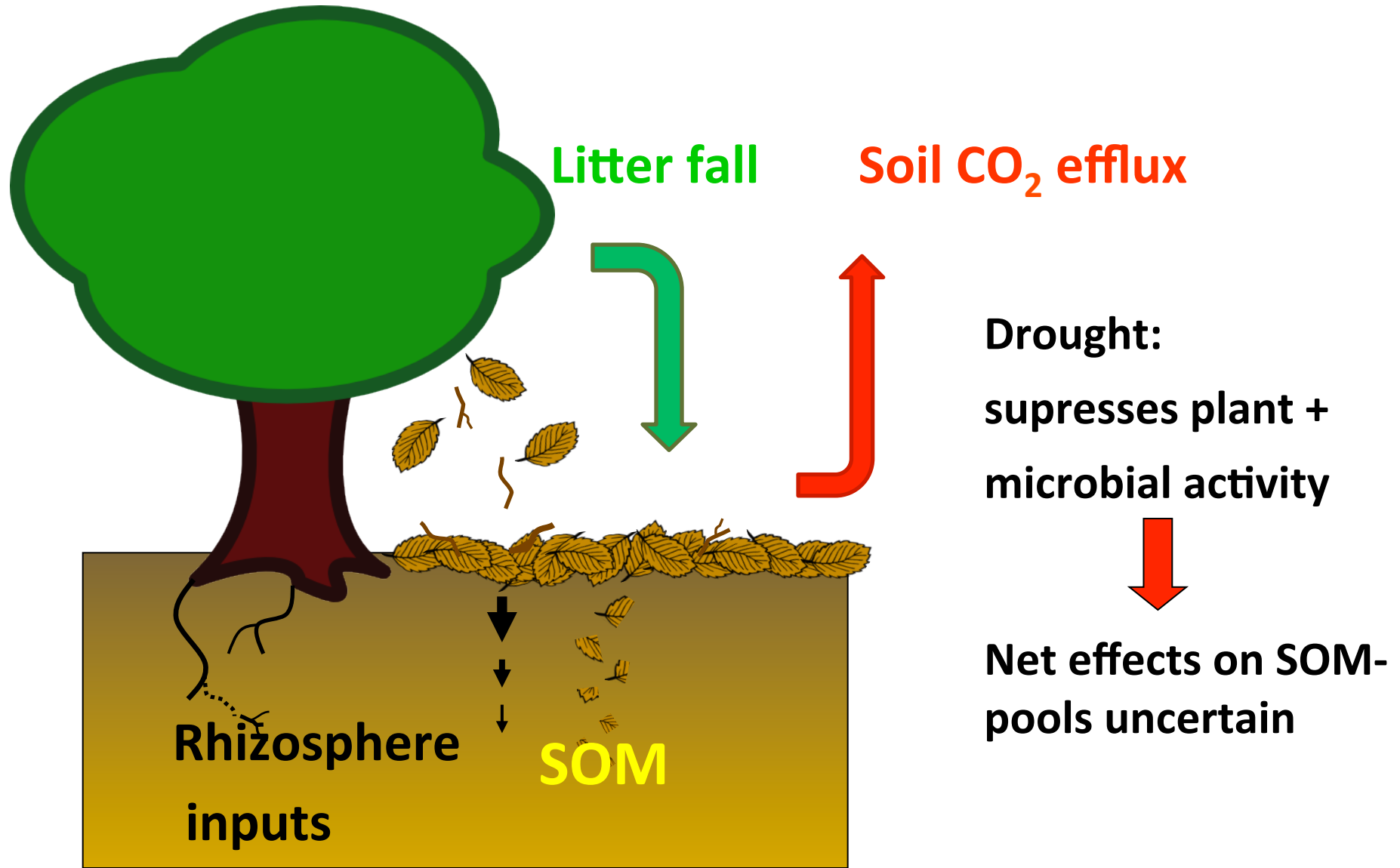


News from the dark side

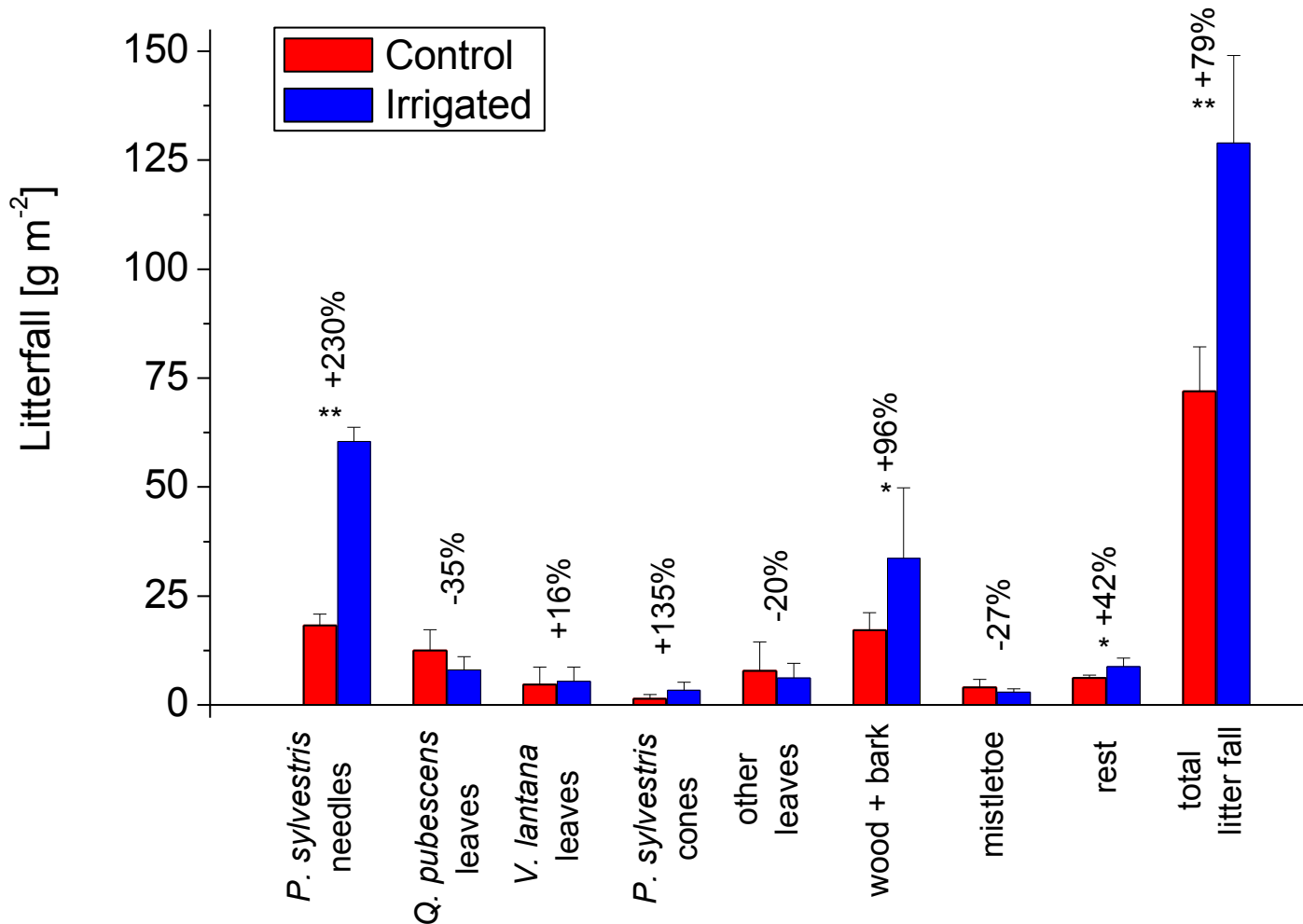
Carbon cycling at Pfynwald

Frank Hagedorn, Michael Vogel, Cheng Xiaomei, Alois Zürcher

Organic matter cycling

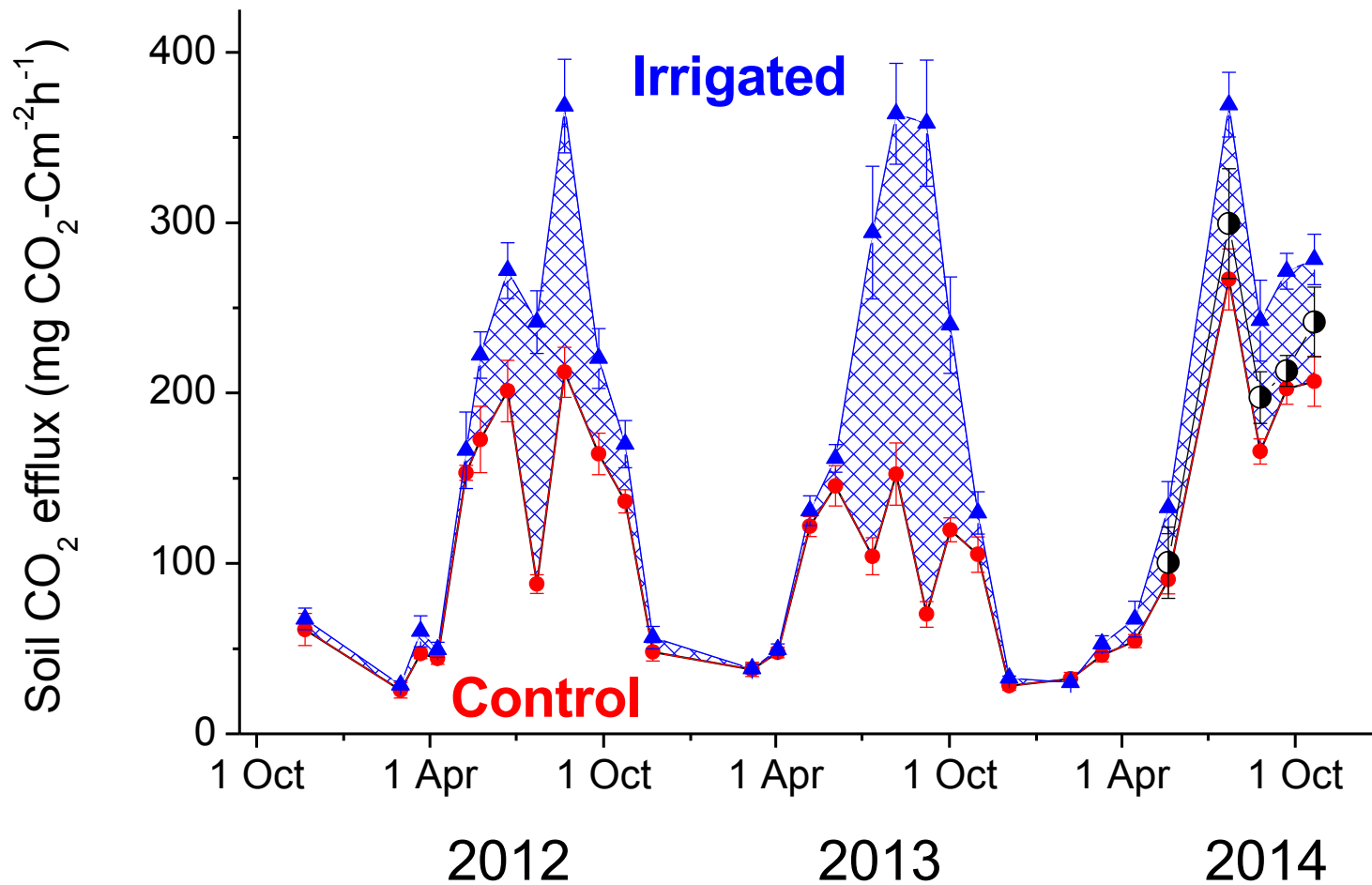


Litterfall: species specific responses



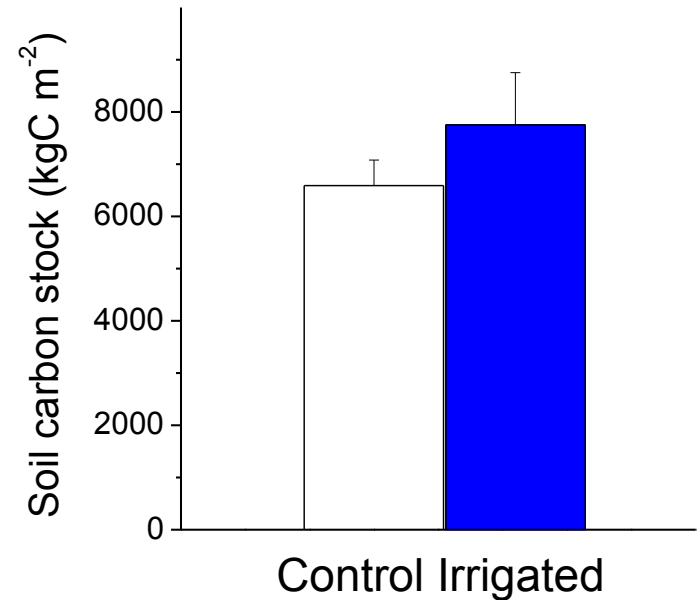
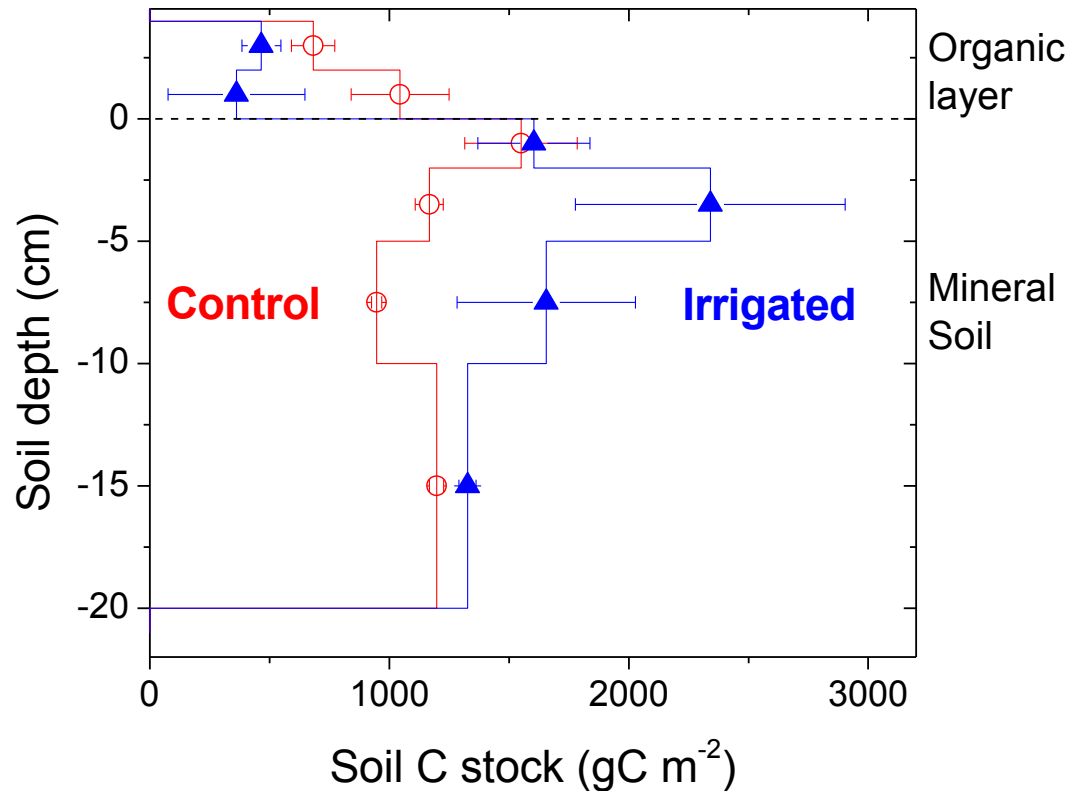
October 2013- April 2014; n=4 per treatment; 5 litter traps per plot

Soil CO₂ efflux



n=4 per treatment; 4 collars per plot

Soil organic carbon stocks



2011; n=4 plots per treatment; 4 profiles per plot

Soil organic carbon stocks

C- losses in organic layer, C gains in mineral soil under irrigation

- 1. Increased C-input in rhizosphere + increased litter decomposition**
- 2. Higher incorporation of litter in mineral soil by macrofauna (earthworms)**

Litter decomposition: effects of irrigation, tree species and soil fauna

Master thesis

Michael Vogel

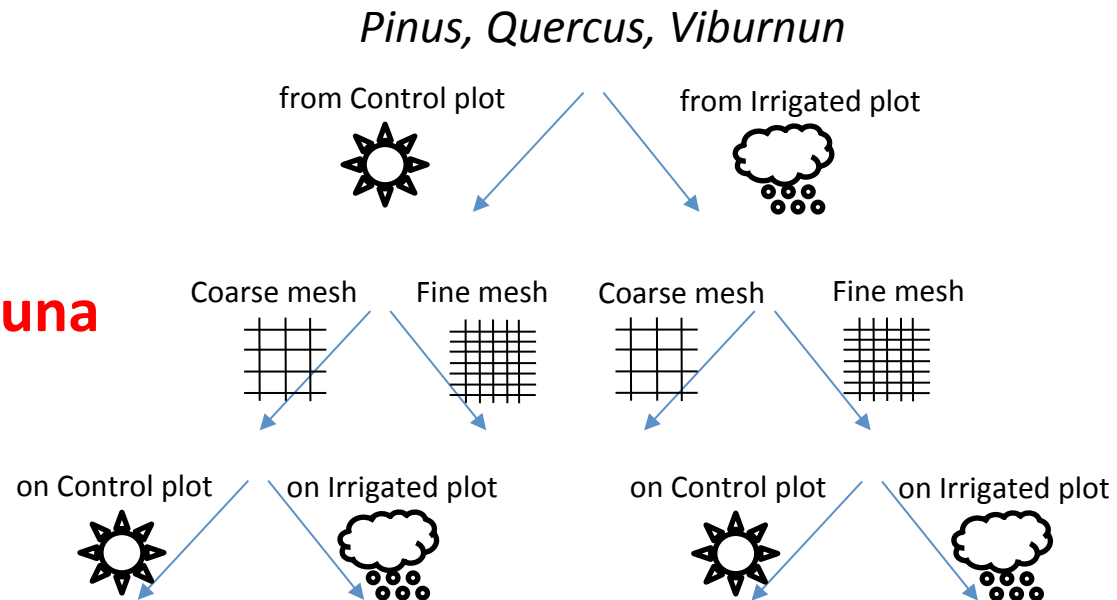


Species

Origin

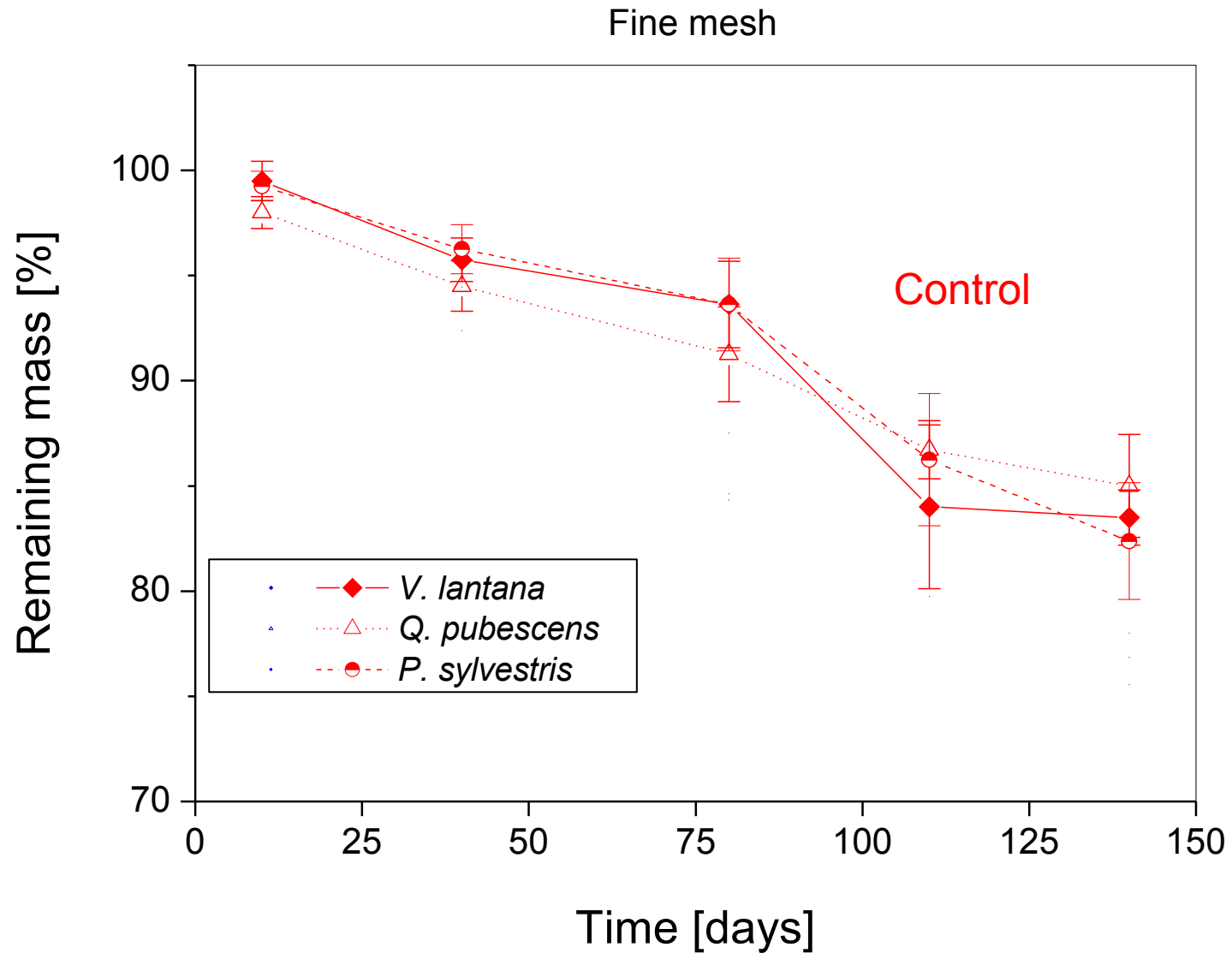
Macro vs. Microfauna

Irrigation

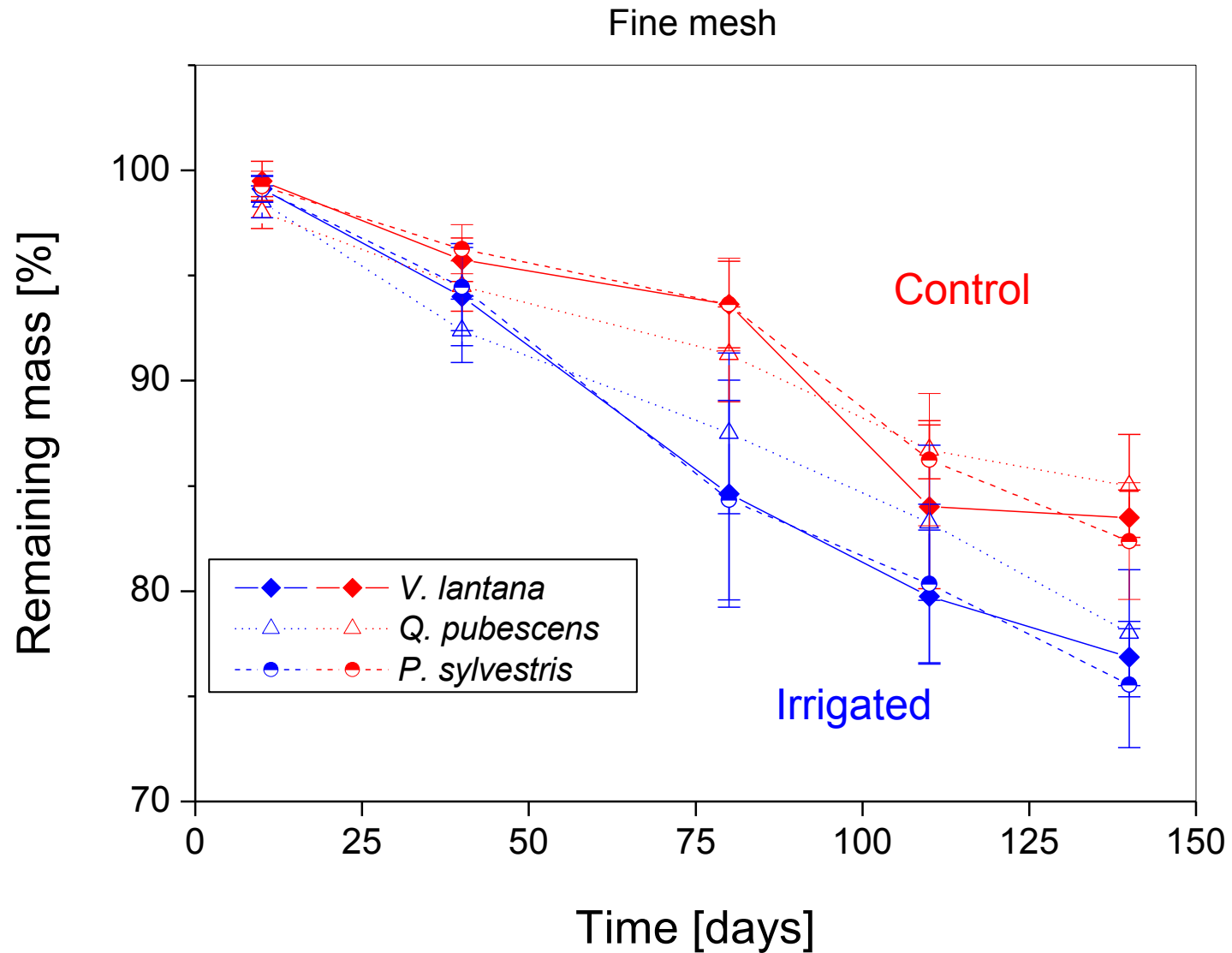


Total n = 580

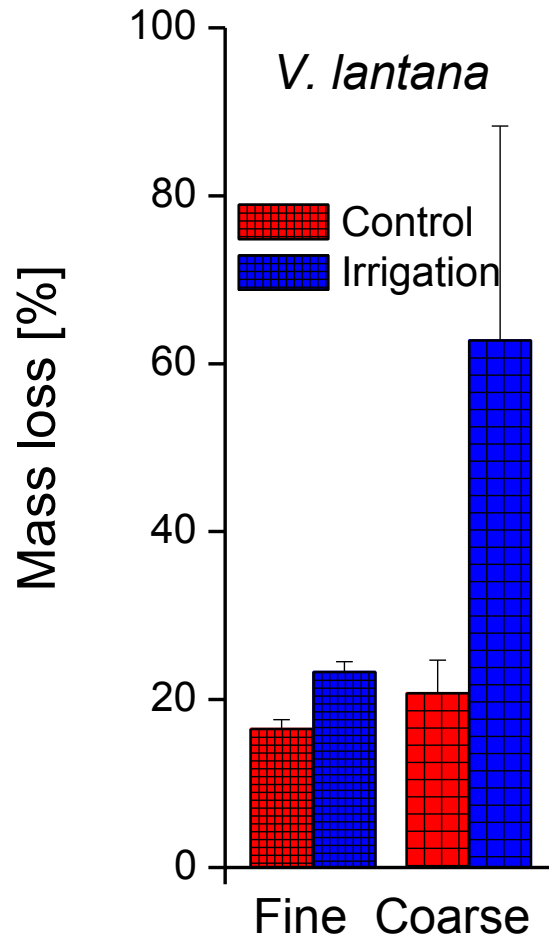
Litter Bag Mass loss: microfauna



Litter Bag Mass loss

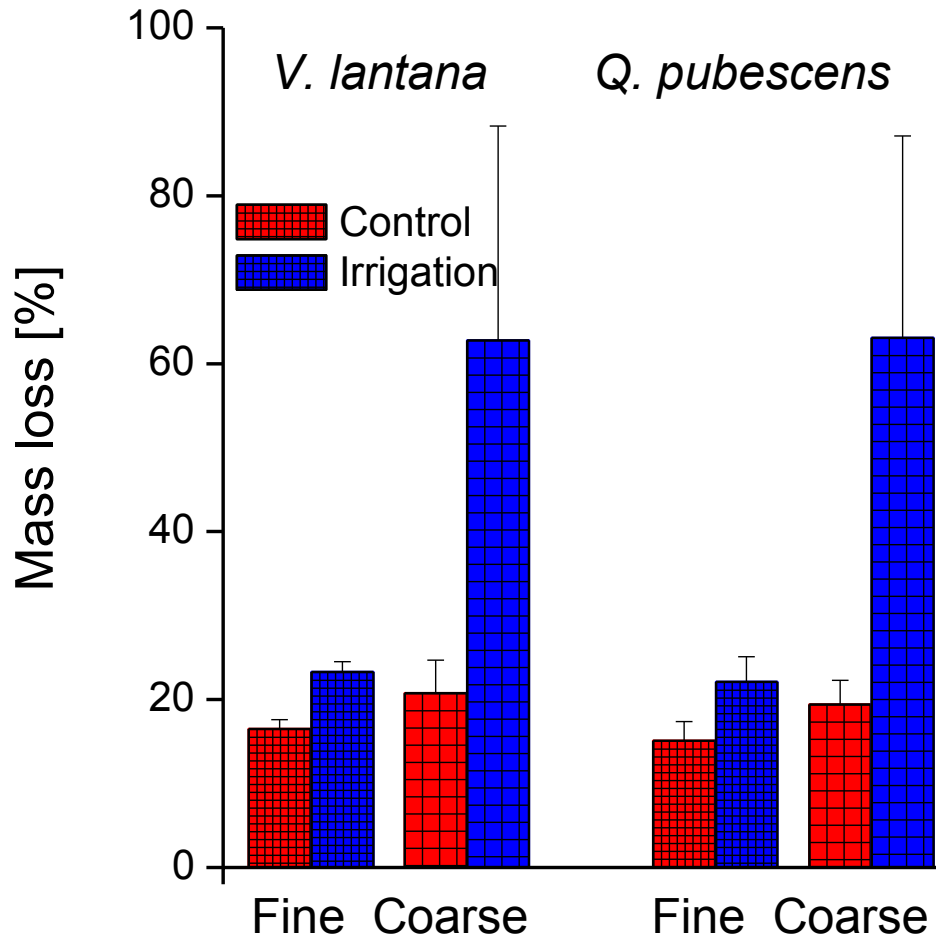


Litter Bag Mass loss: micro vs. macrofauna



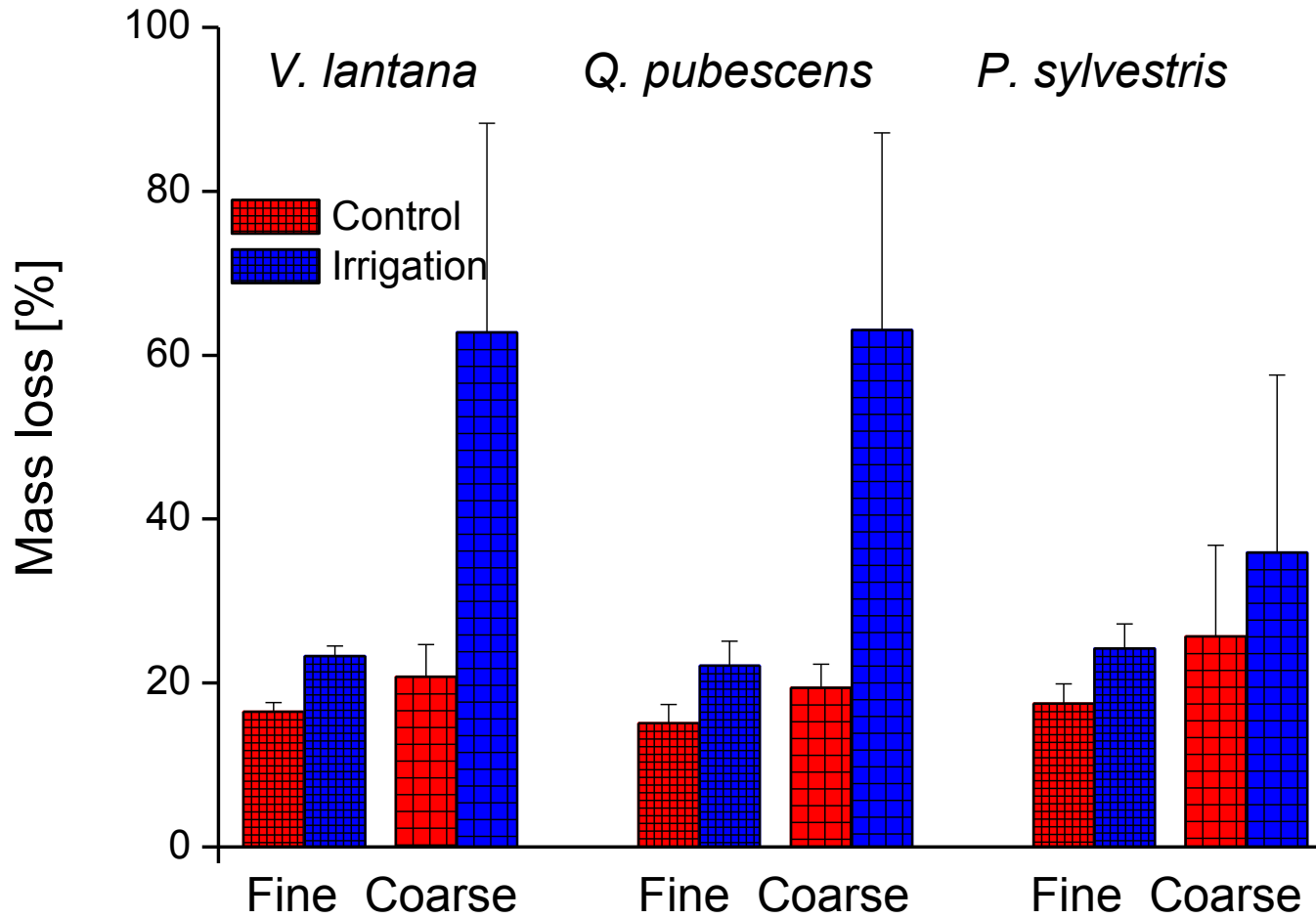
After 140 days

Litter Bag Mass loss: micro vs. macrofauna



After 140 days

Litter Bag Mass loss: micro vs. macrofauna



After 140 days

Summary

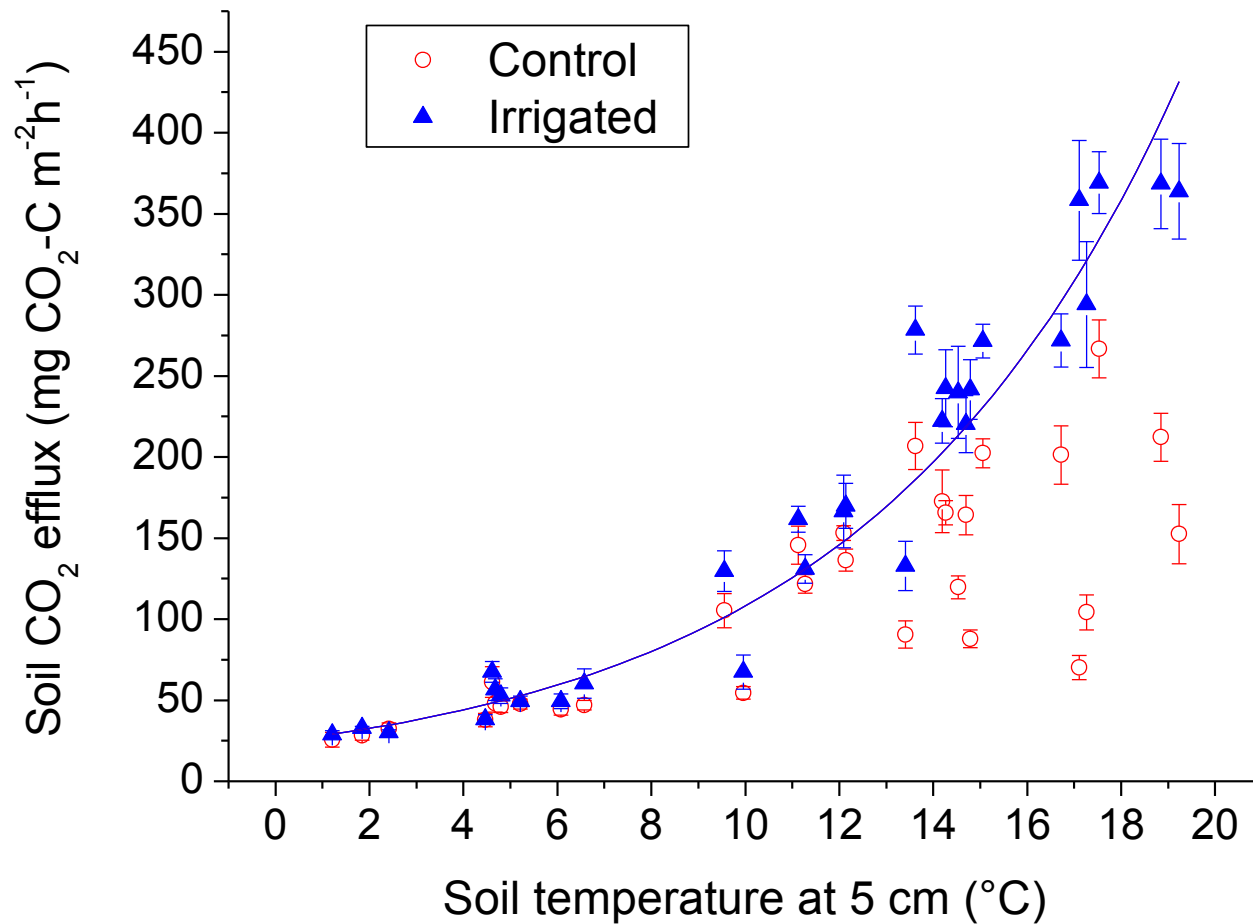
Irrigation in a water-limited pine forest:

1. Increases organic matter fluxes (litter, fine roots, soil CO₂ effluxes)
2. Increases C-pools (C gains > C losses)
3. Accelerates decomposition, particularly via macrofauna

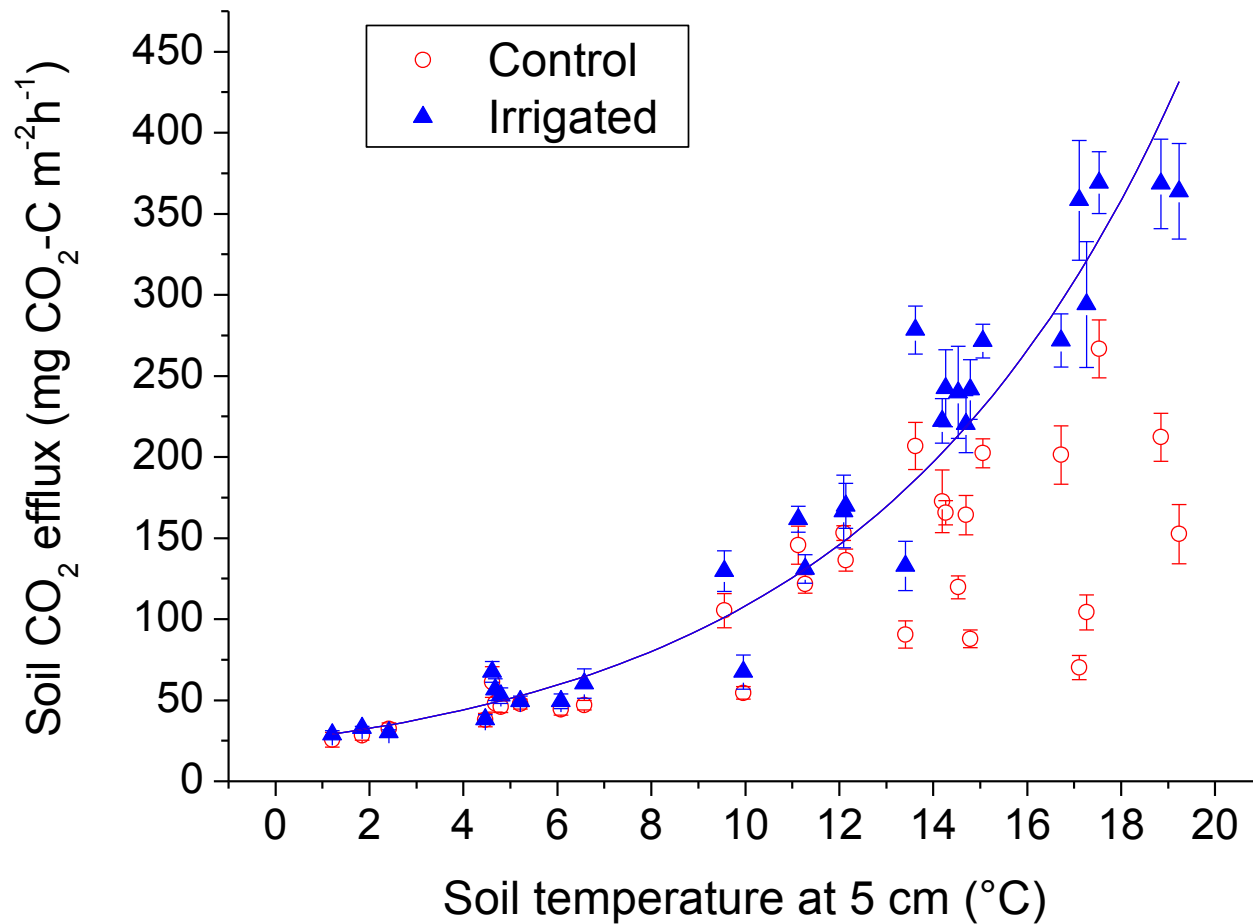
Next plans

1. Response of soil fauna
2. Linking experimental irrigation to 'natural' precipitation gradient (PhD thesis, Sia Gosheva)
3. Separating auto- and heterotrophic soil respiration
4. Using ^3H from irrigation water to quantify SOM turnover
5. Elucidating SOM cycling using ^{14}C

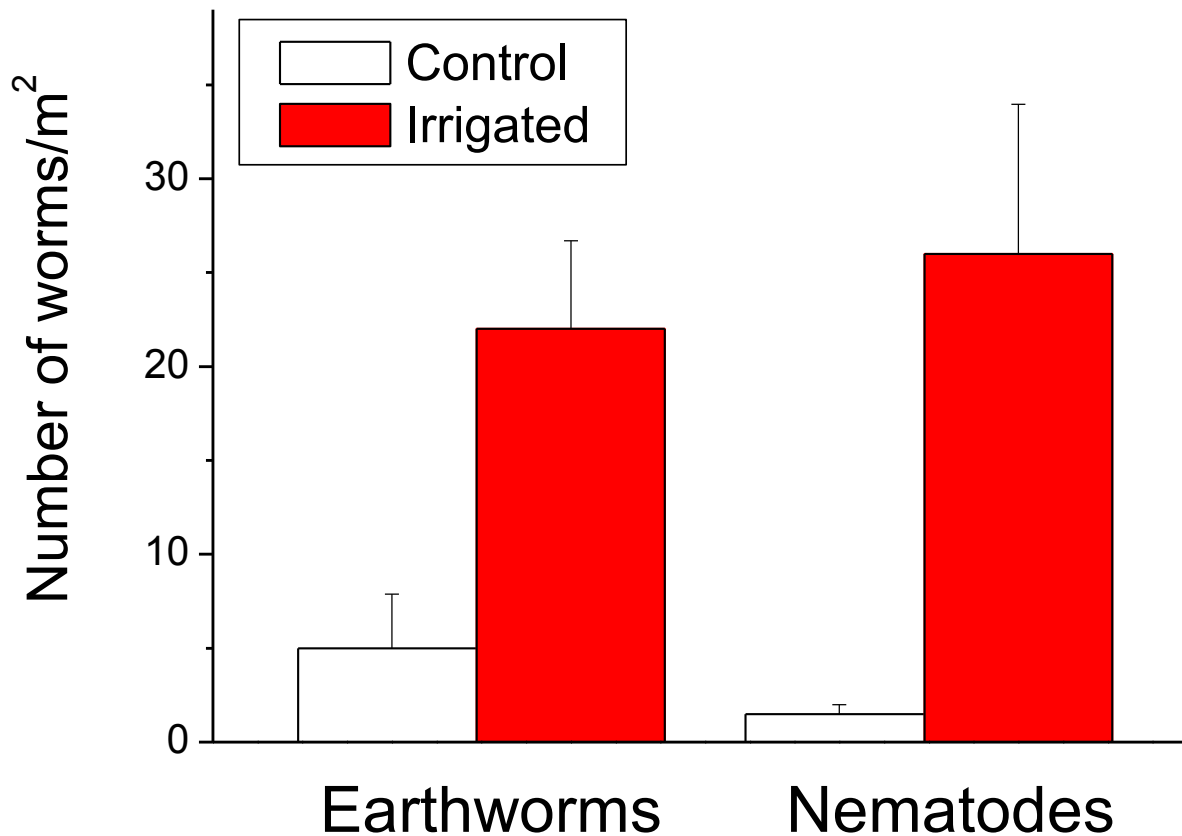
Soil CO₂ efflux



Soil CO₂ efflux

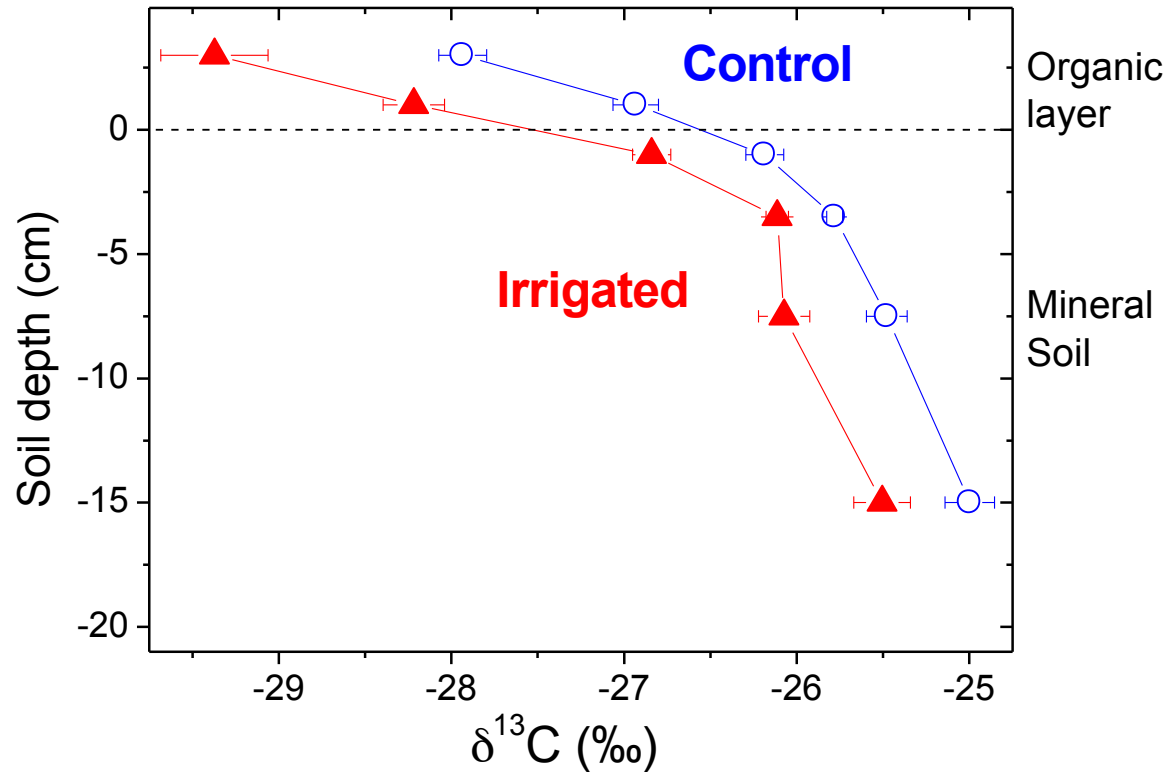


Soil macro fauna



n=4 per treatment; 2 samples per plot

Natural ^{13}C abundance



- Irrigation decreases $\delta^{13}\text{C}$ values in plants and soils
- Implies: Substantial input of „new“ C into soil