# Translating Soil Aggregate-Size Understanding of Microbial Carbon Accumulation to Ecosystem-level Predictions

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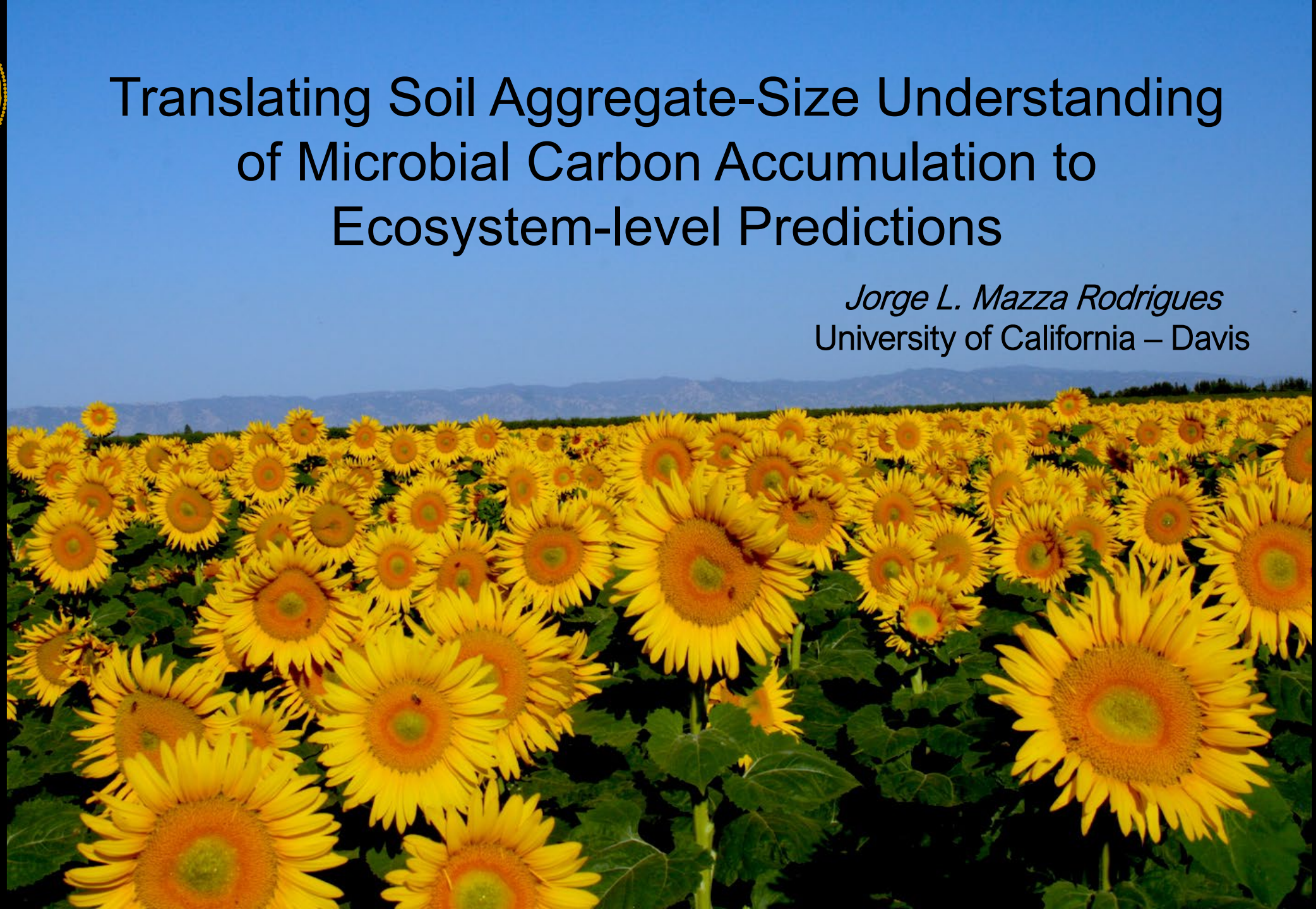

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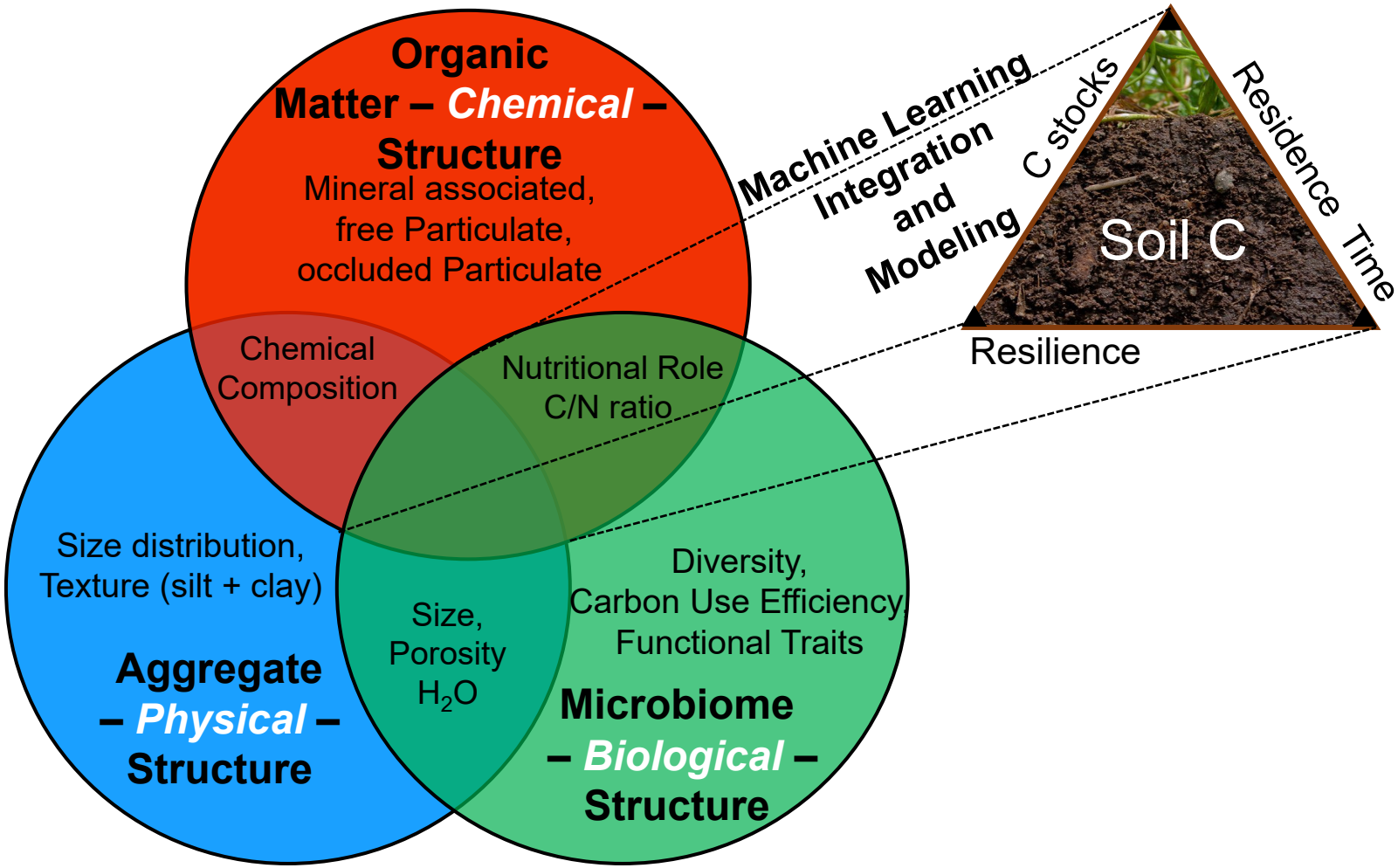
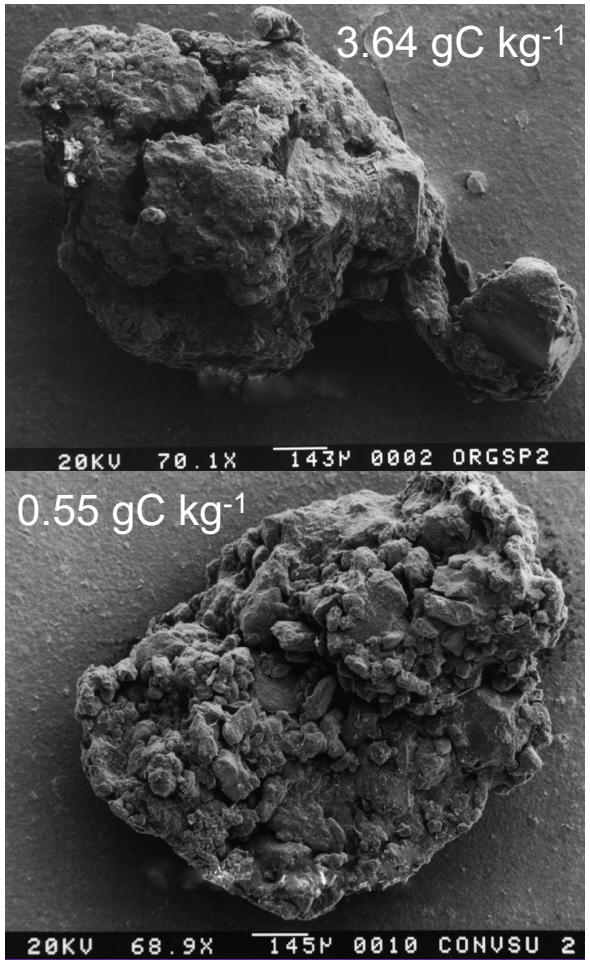
Soil EcoGenomics Lab

# The Concept of Soil Health and Long Term C Storage

The capacity of the soil to function as a vital living system to sustain biological productivity, maintain environment quality, and promote plant, animal, and human health.

(Doran and Zeiss, 2000)

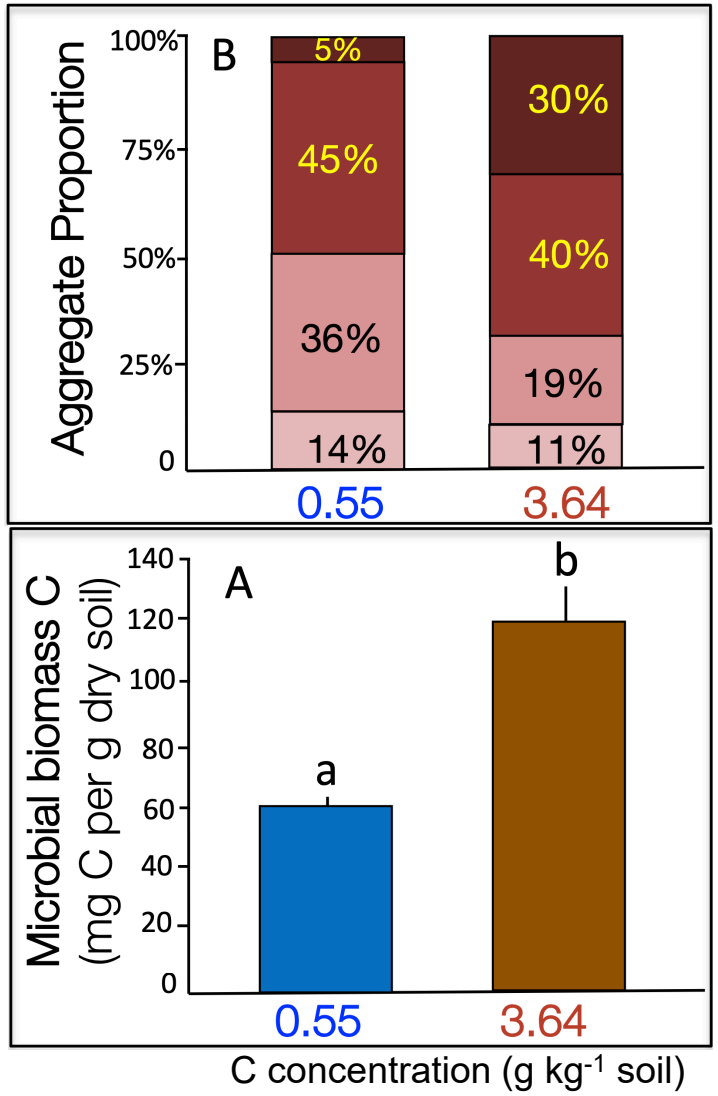


# Linking soil aggregate structure to C storage

| Property | MAOM | oPOM | fPOM |
|---|---|---|---|
| Protection Mechanism | Clay | Microaggregates | Macroaggregates |
| Mean Residence Time | Centuries | | Days |
| Dominant Formation Pathway | Transformation / Fragmentation | | |
| Subject to Saturation | More | Less | NO |
| Dominant Chemical Constituent | Monomers | | Polymers |
| C:N ratio | 8 | | 40 |
| Nutritional Role | Easy | | Complex |

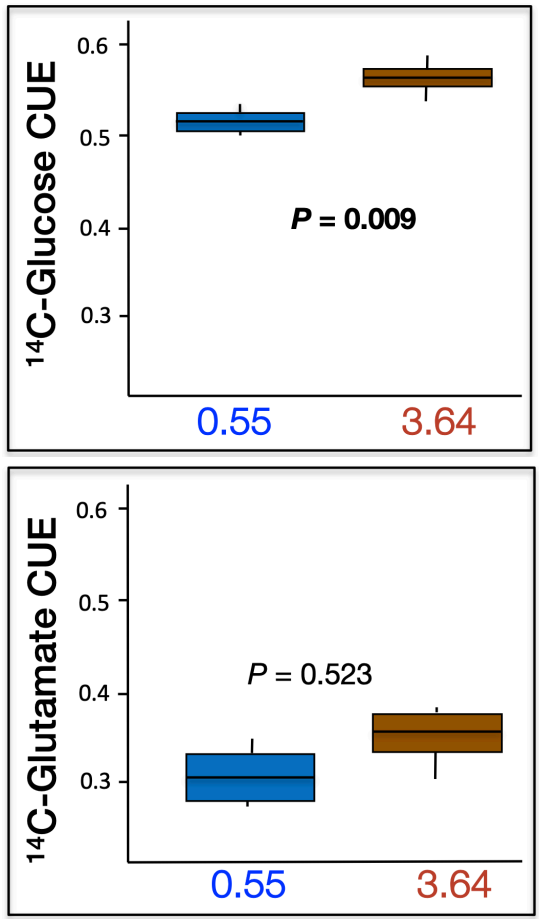
Soil Organic Matter separated in three main components and their properties: MAOM – Mineral Associated OM, oPOM – occluded Particulate OM, and fPOM – free particulate OM. (*modified from Lavallee et al. 2019*)



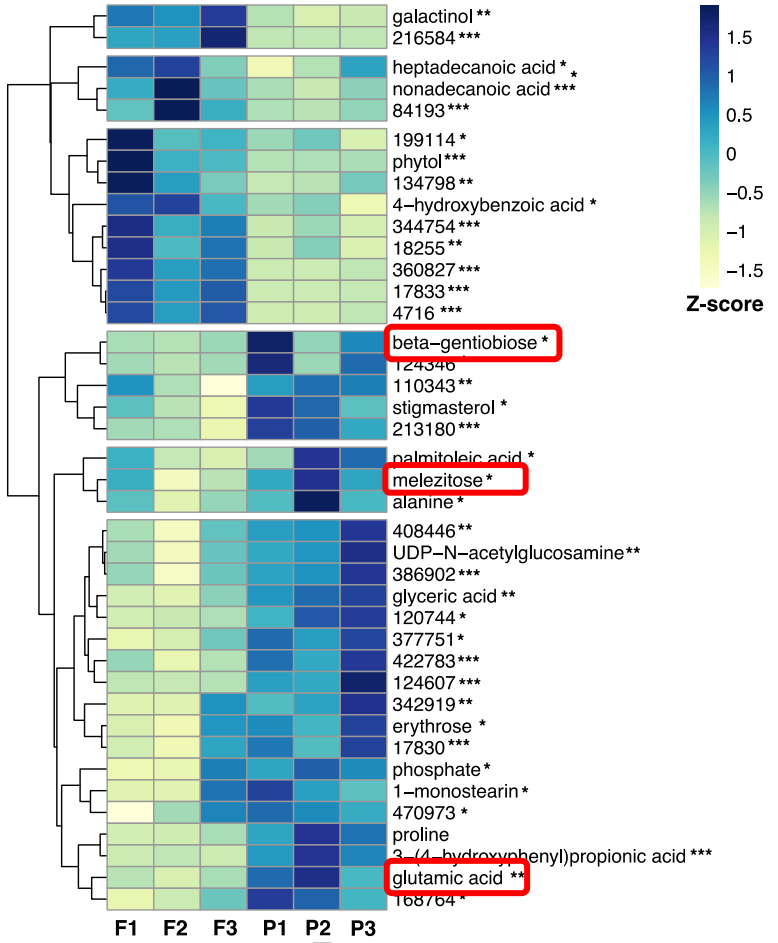

Lin et al. (2022) *under review*

# Dataset Integration to Predict Soil Carbon Stabilization under different Management Scenarios

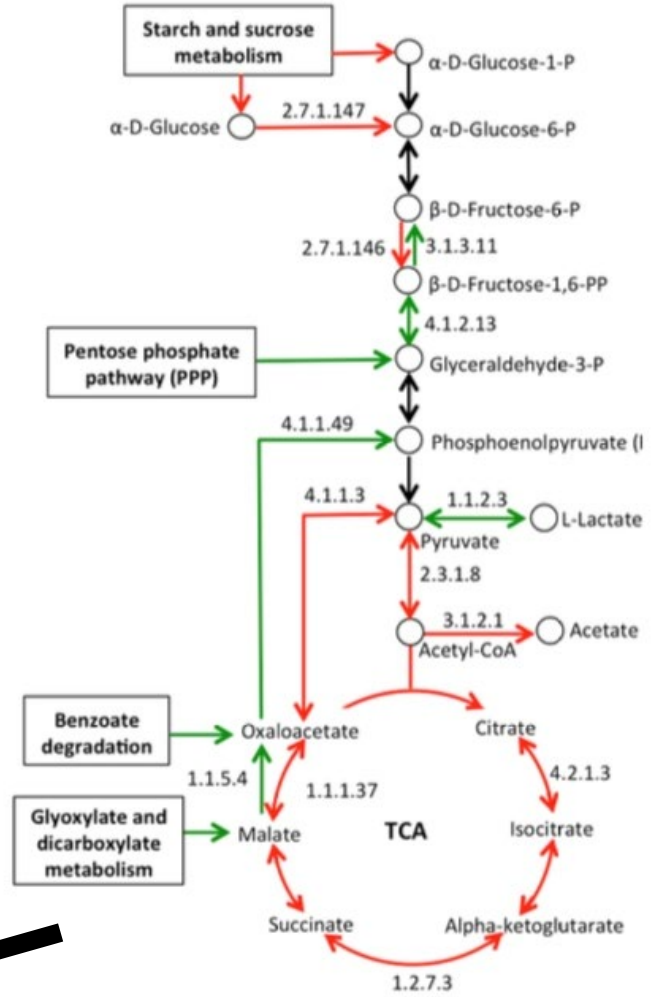
## Carbon Use Efficiency




## Metabolomics




## Supervised Machine Learning




Khan et al. (2022) *under review*

## Millennial Model

(Abroffman et al. 2018)