

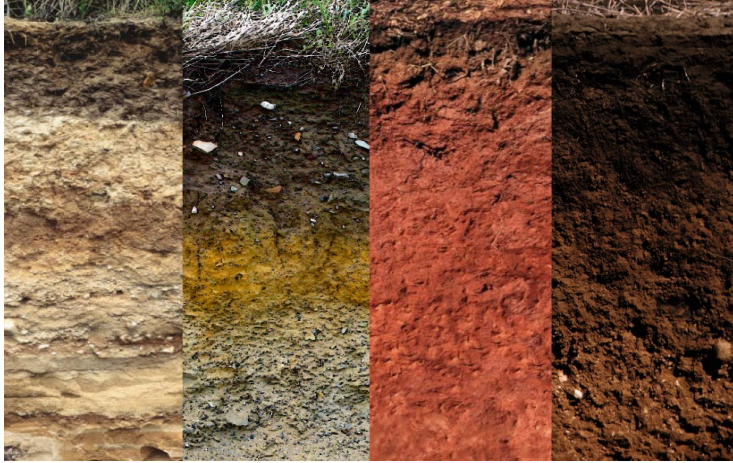


Duval Lab & The Compatriots

Russian olive influence along the Rio Grande:
ecosystem restoration, climate, chemistry, bugs & bacteria

Motivation:

Soil biology is fundamental to understanding and mitigating climate change



Control on atmospheric gases and nutrients (source and sink)

Influence climate via *intentional* land use



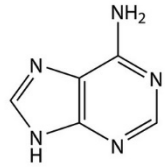
Nitrogen is a “keystone” element (+/-)



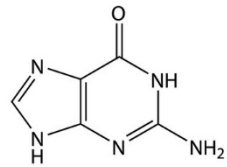
Also a nutrient for things we *don't* want to grow...



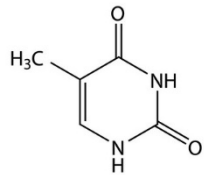
Nitrogenous bases



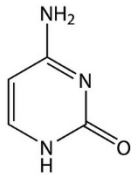
Adenine



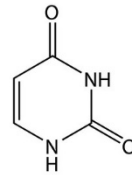
Guanine



Thymine



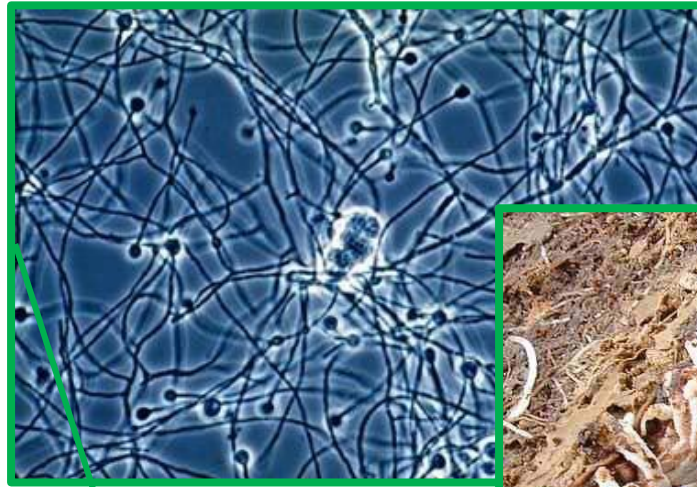
Cytosine



Uracil

Excess N (*often* fertilizer overuse) = higher $N_2O/NO/NO_x$ emissions
= generally lower native plant diversity
= P and other element limitation due to stoichiometric mis-matches

Elaeagnus angustifolia



Frankia sp.

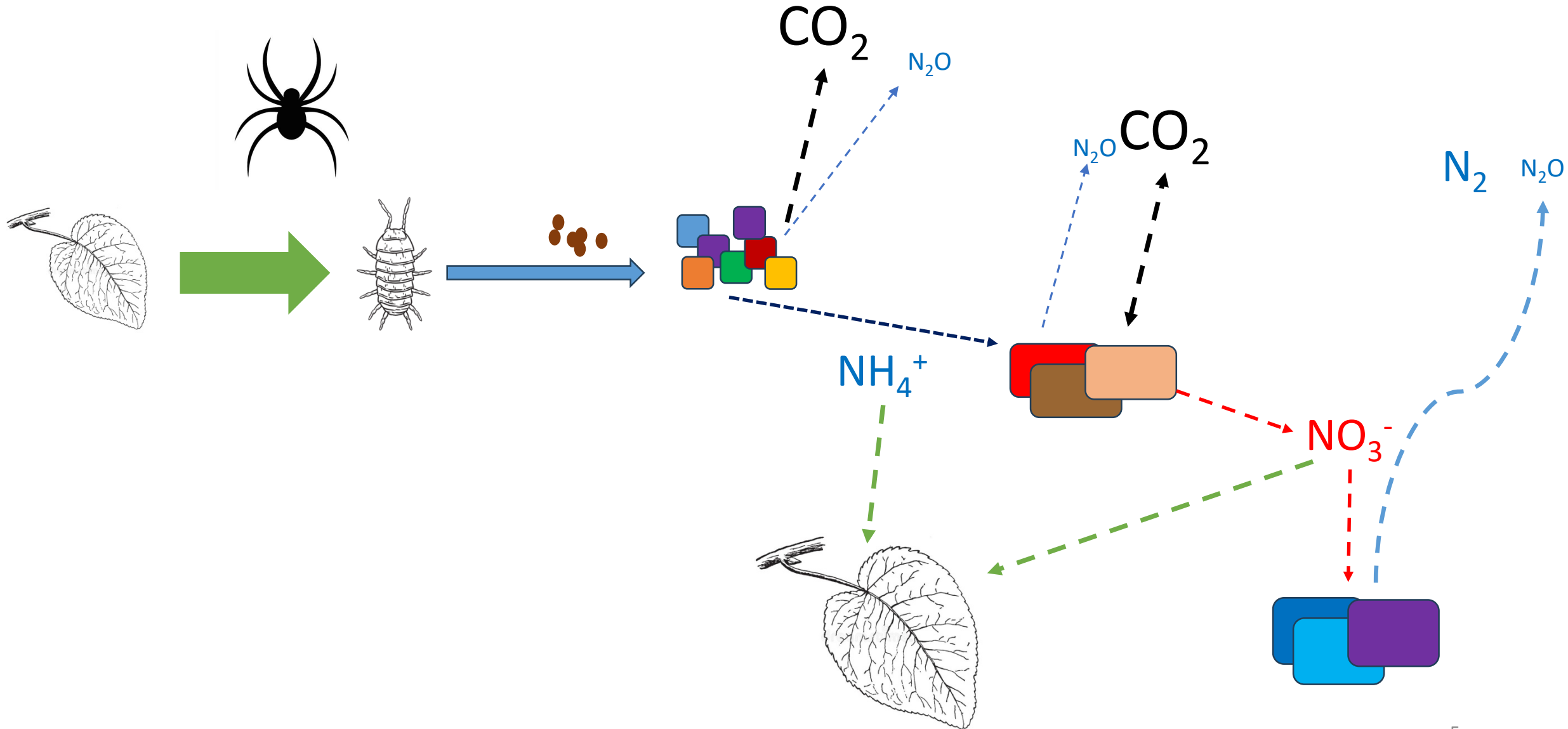


OrgN
OrgN
OrgN

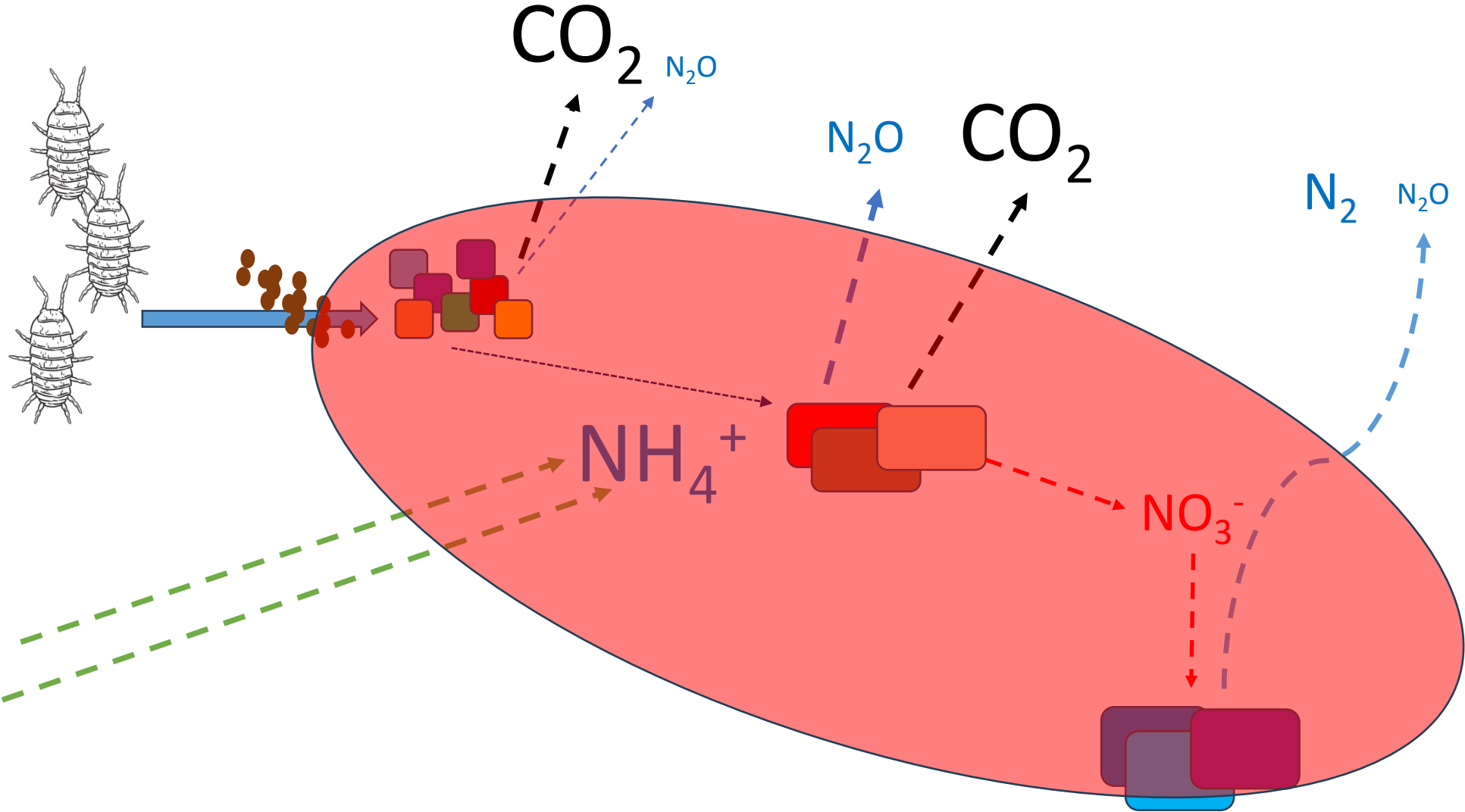
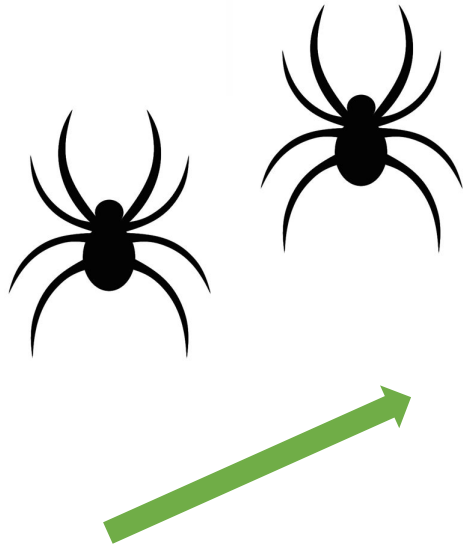


NH_3

Nitrogen cycling: incorporates climate and ecological variables of interest



Nitrogen cycling: incorporates climate and ecological variables of interest



5371319

Middle Rio Grande

140 hectares removed

POP vs. ROS vs. ROX

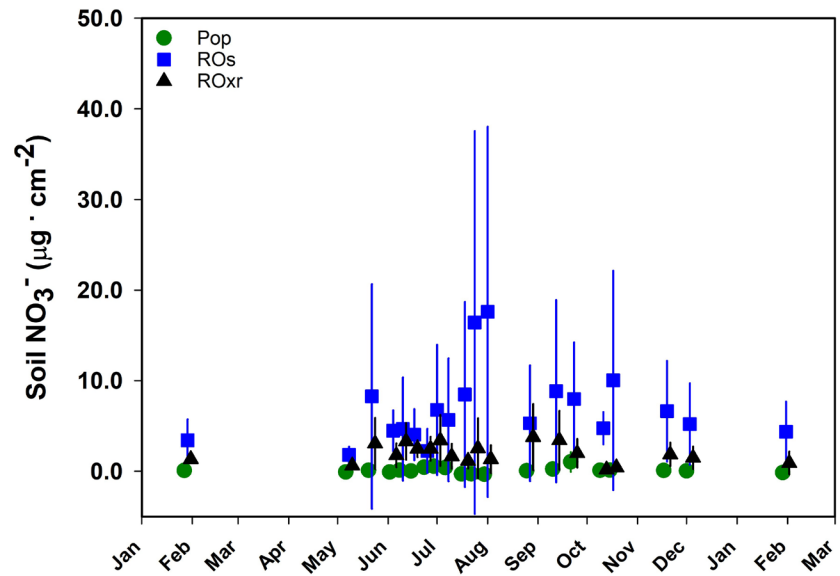
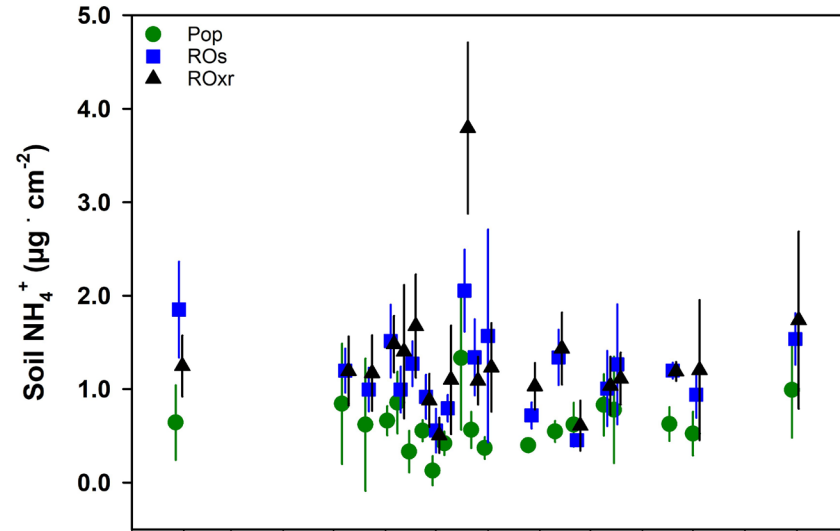
Plant effect on soil N?

Soil N influence on arthropods?

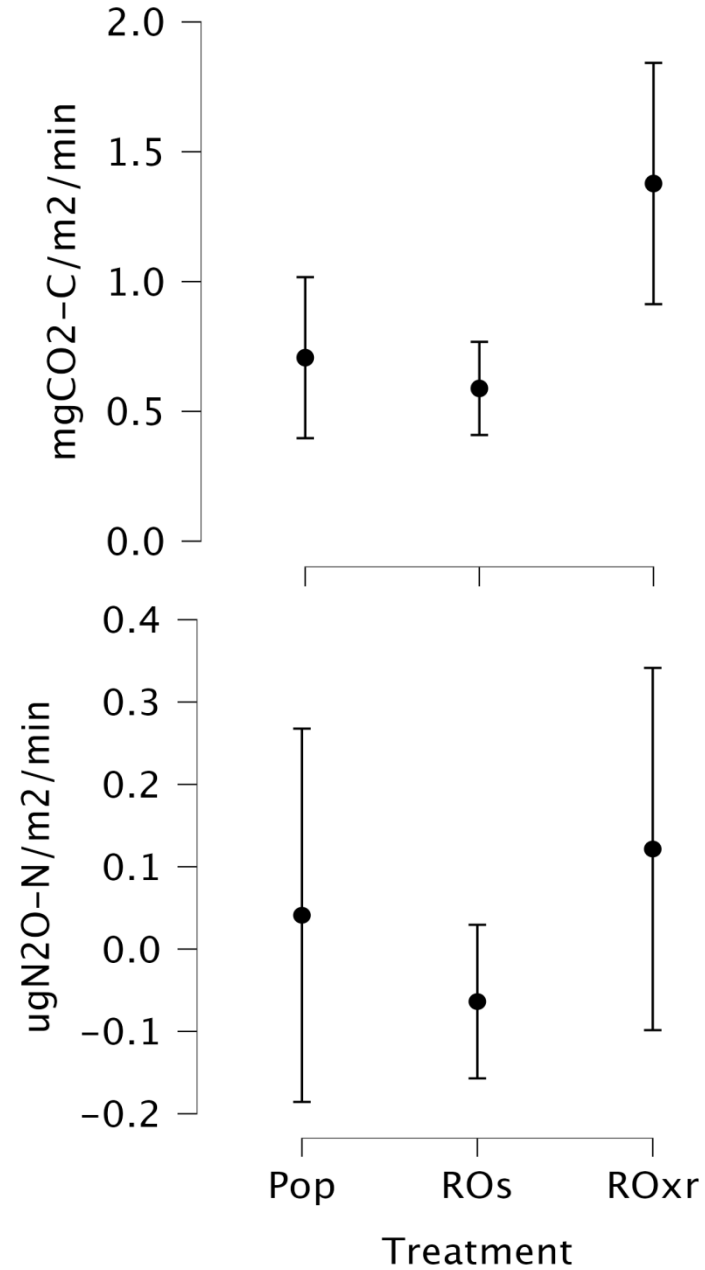
Microbial response/feedbacks?



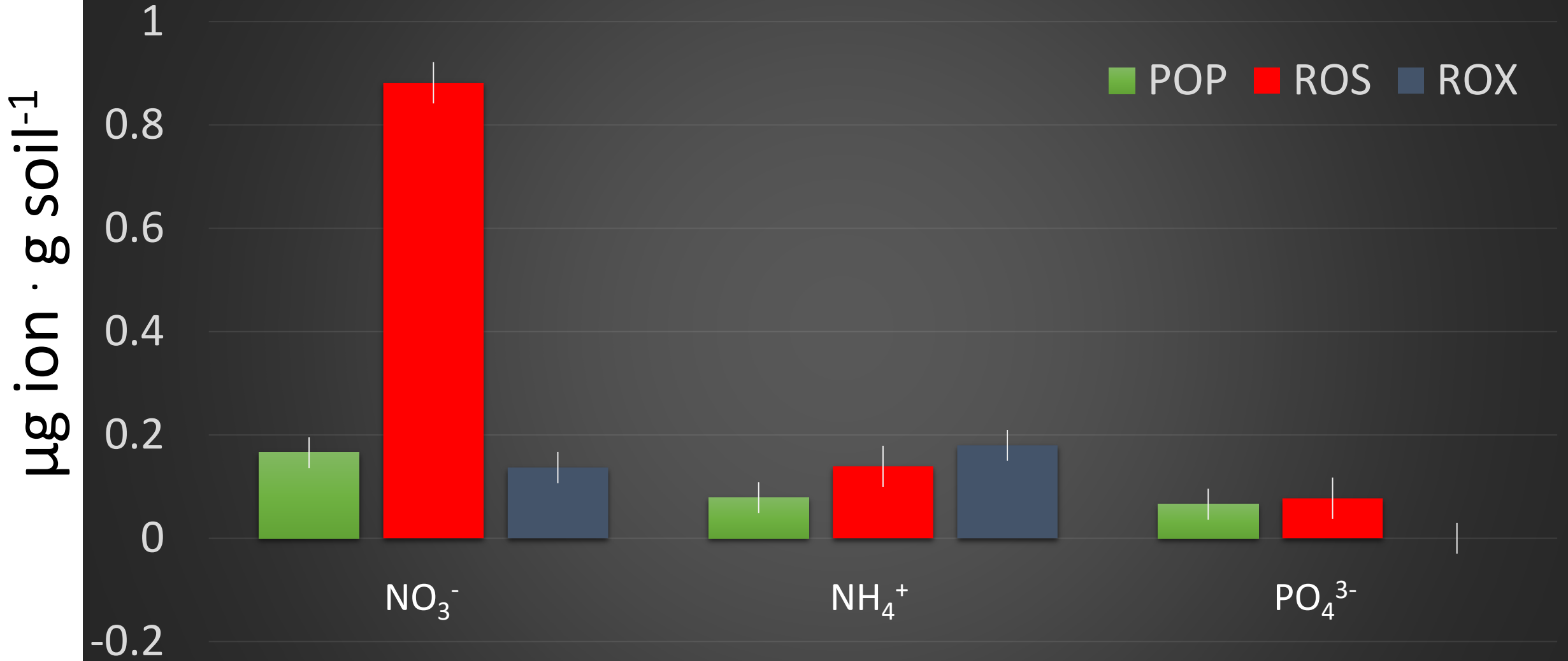
More NH_4^+ and NO_3^- in both *E. angustifolia* plots



Removal plots >GHG, 1yr post

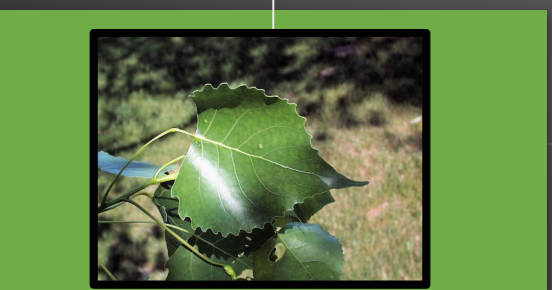
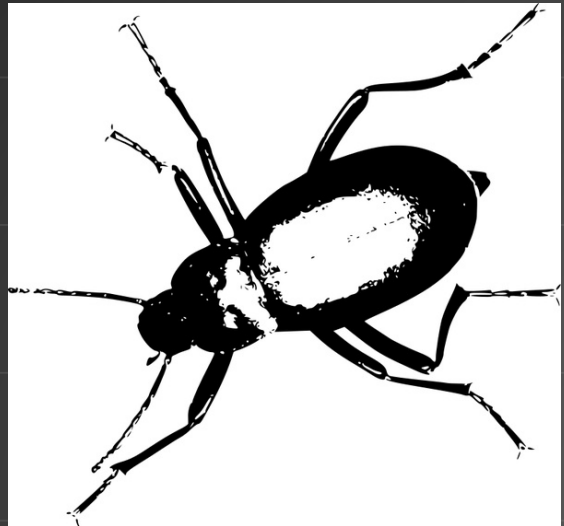


5 years post



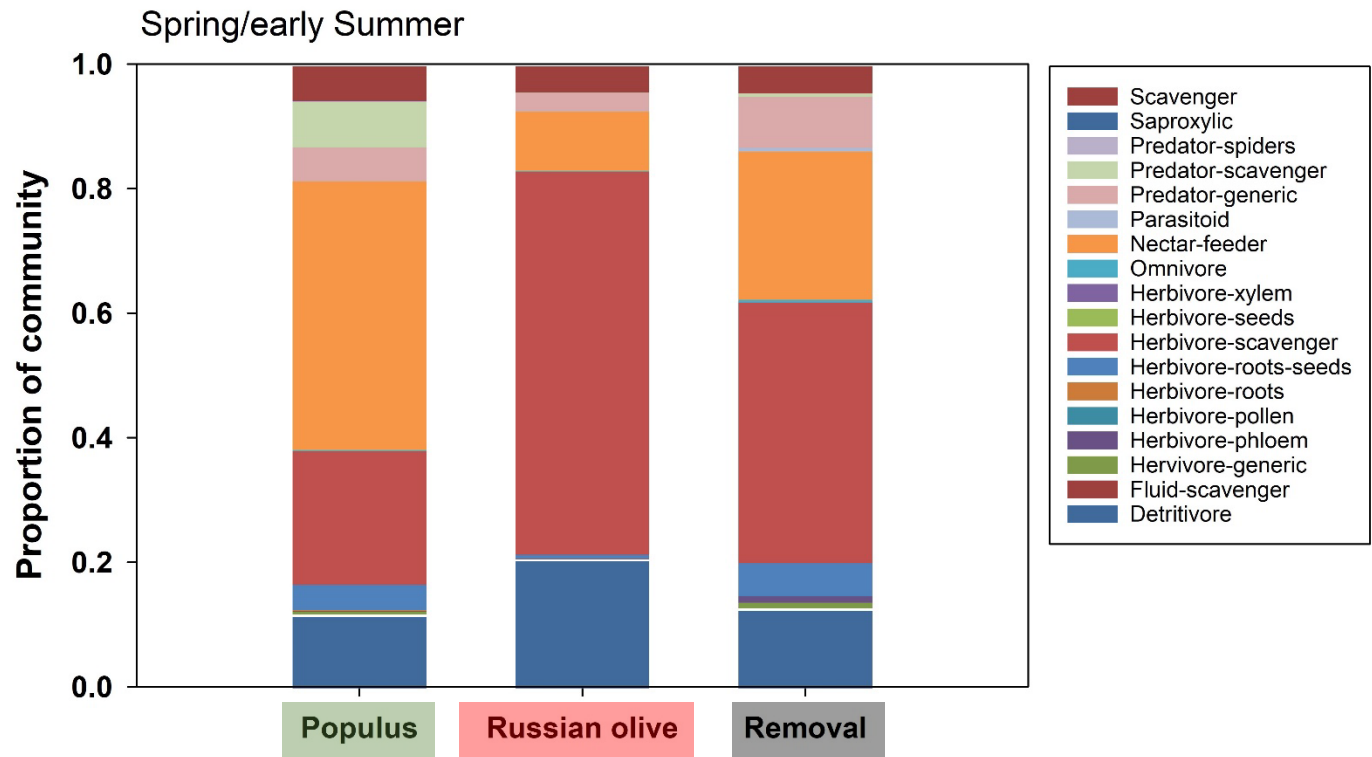
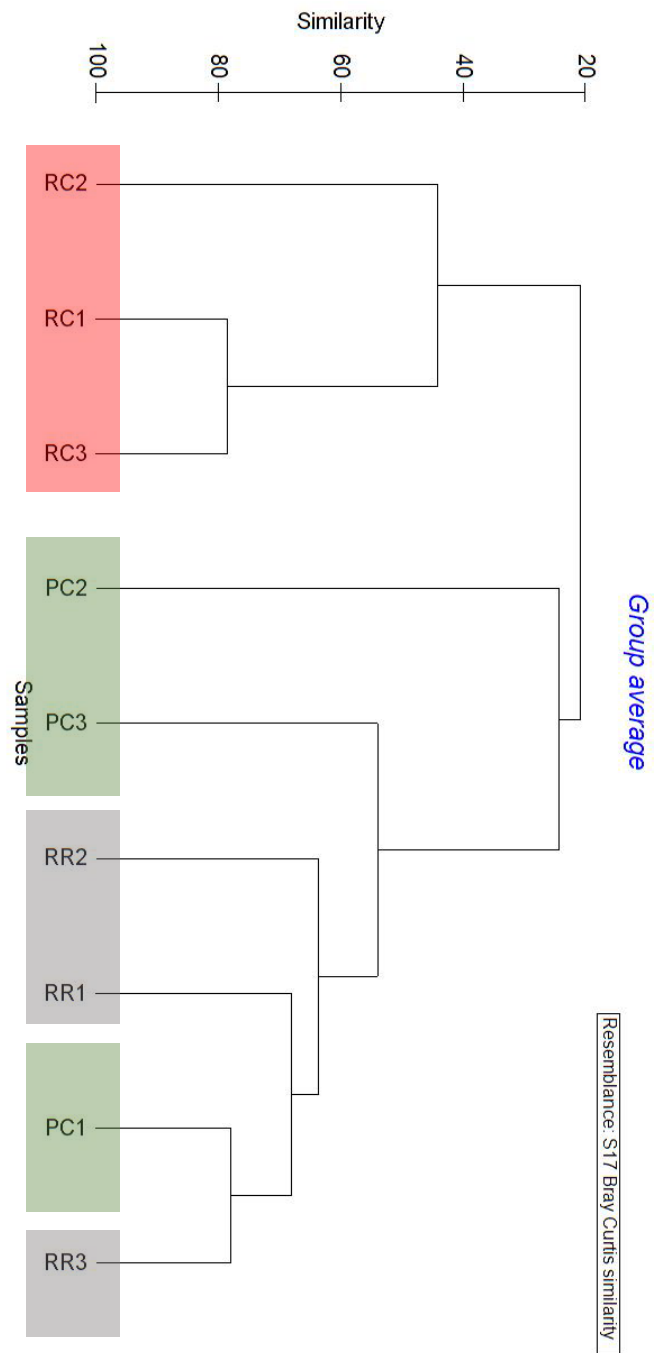
Nitrogen : Phosphorus

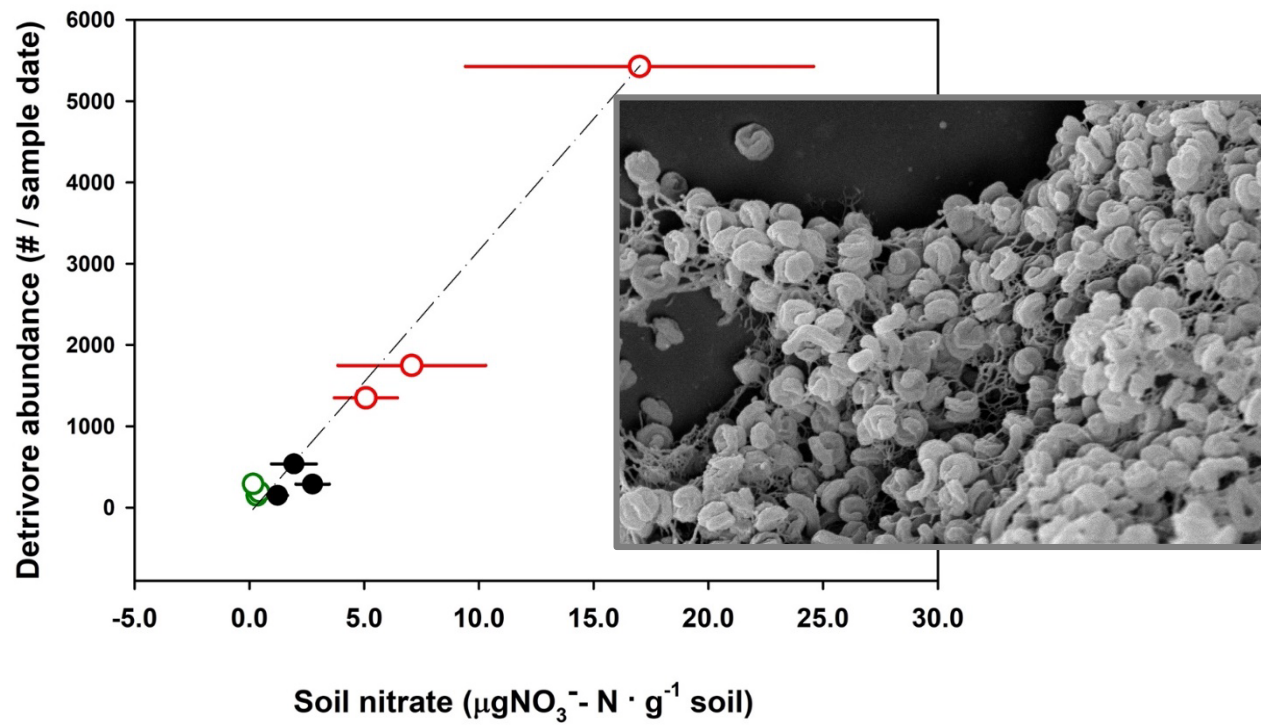
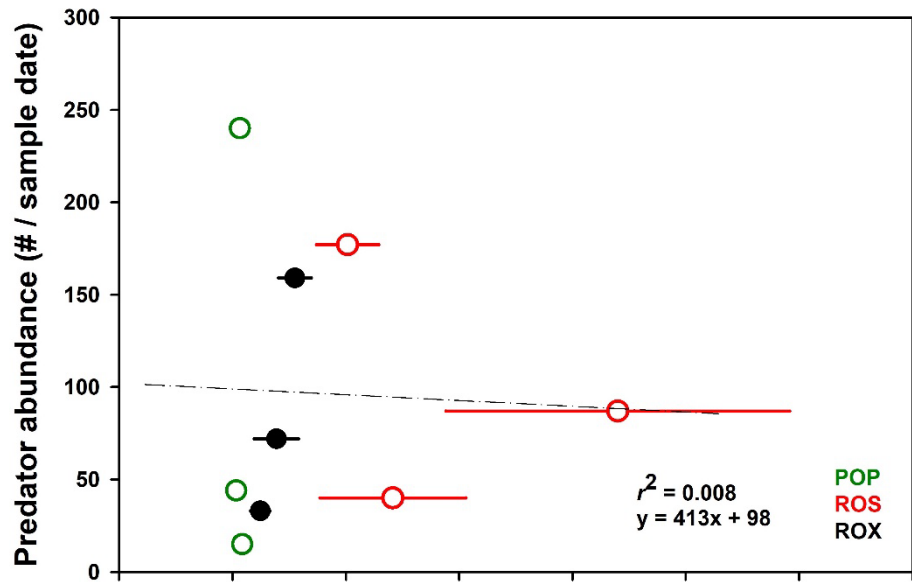
16
14
12
10
8
6
4
2
0

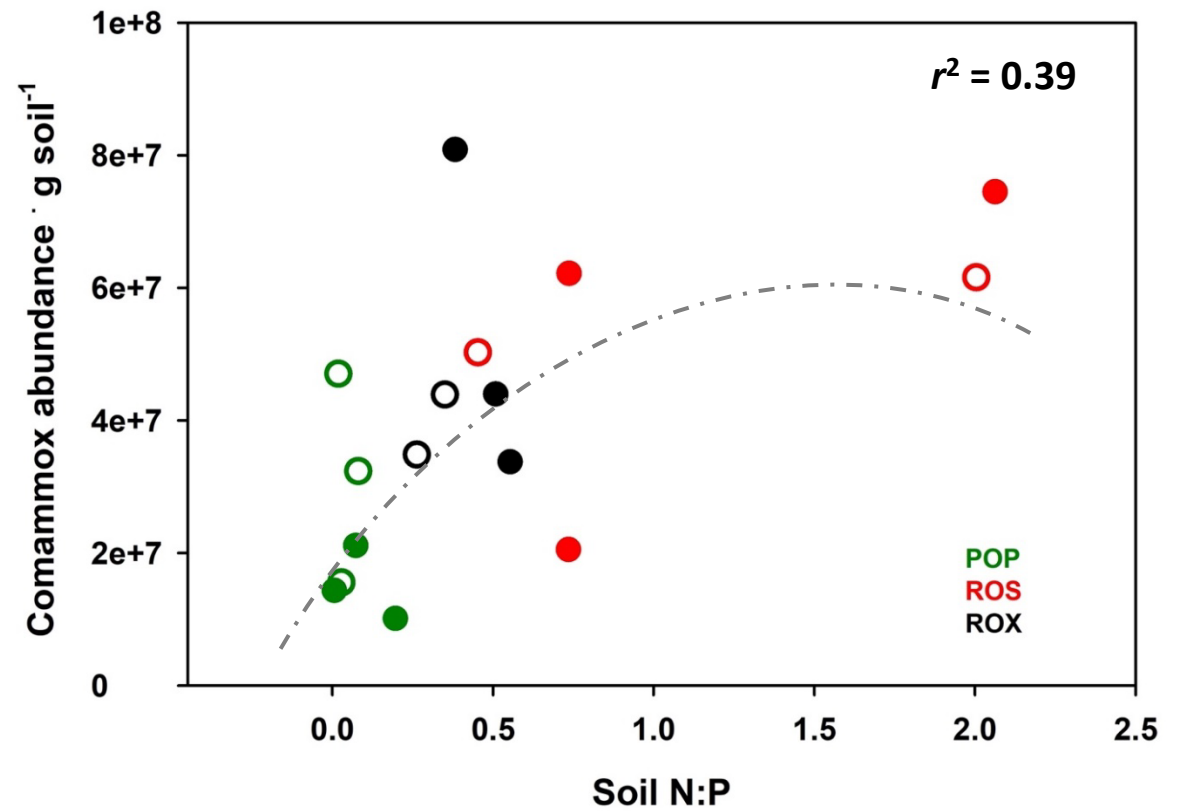
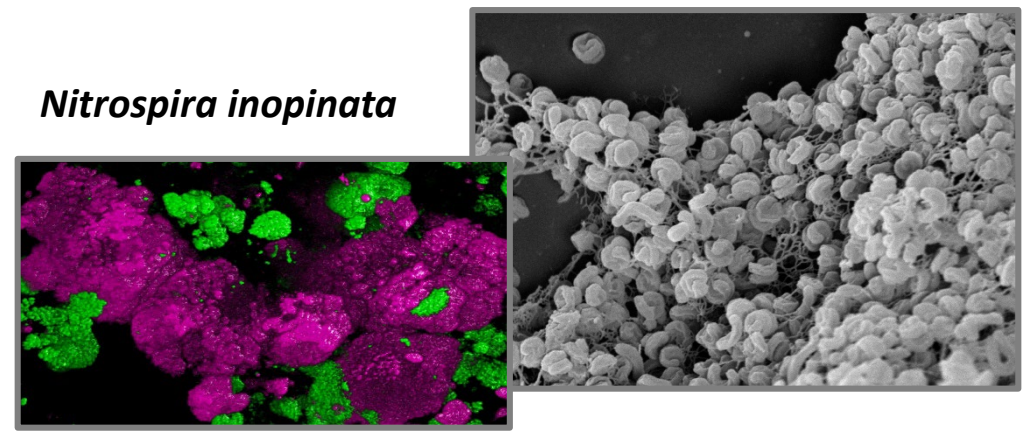
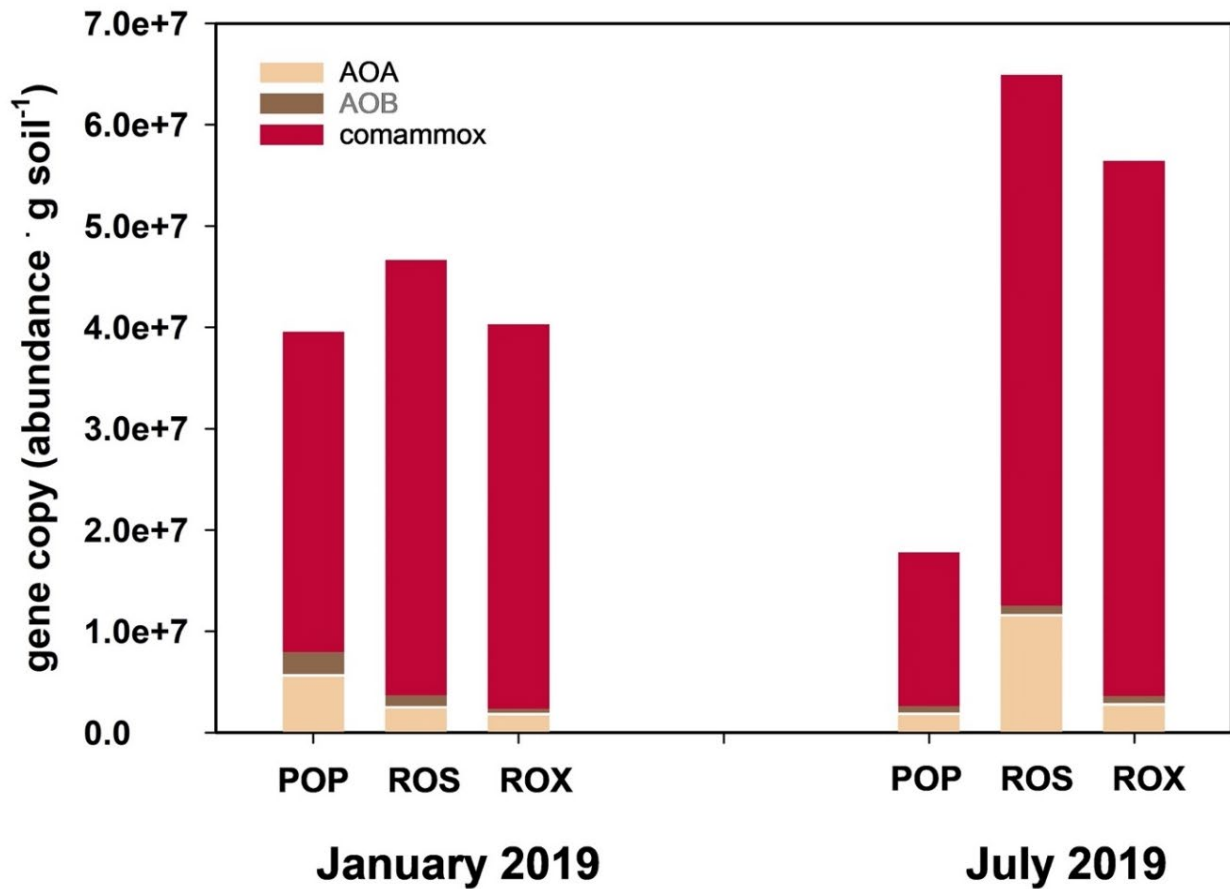
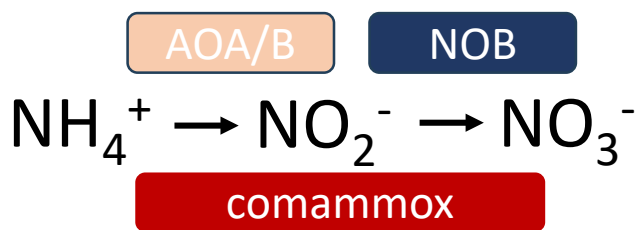


POP

ROS







A scenic landscape featuring a river in the foreground, lush green trees on the left, and a range of mountains in the background under a clear blue sky. The river flows through a rocky bed, and the surrounding vegetation is dense and vibrant.

Where we are:

Ongoing lab incubations to dial in process rates just due to microbes:
(decomp, nitrification, GHG production finer resolution, C cycling)

Arthropod functional patterns with soil chemistry

multivariate story with archaea/bacteria/comammox?

Sergio de Tomas-Marin
Eva Carabotta
Kateri Zamora
Noah Patterson
BIOL 4002/5002

Dan Cadol
Dan Jones
Talon Newton
Stacy Timmons
Bonnie Frey

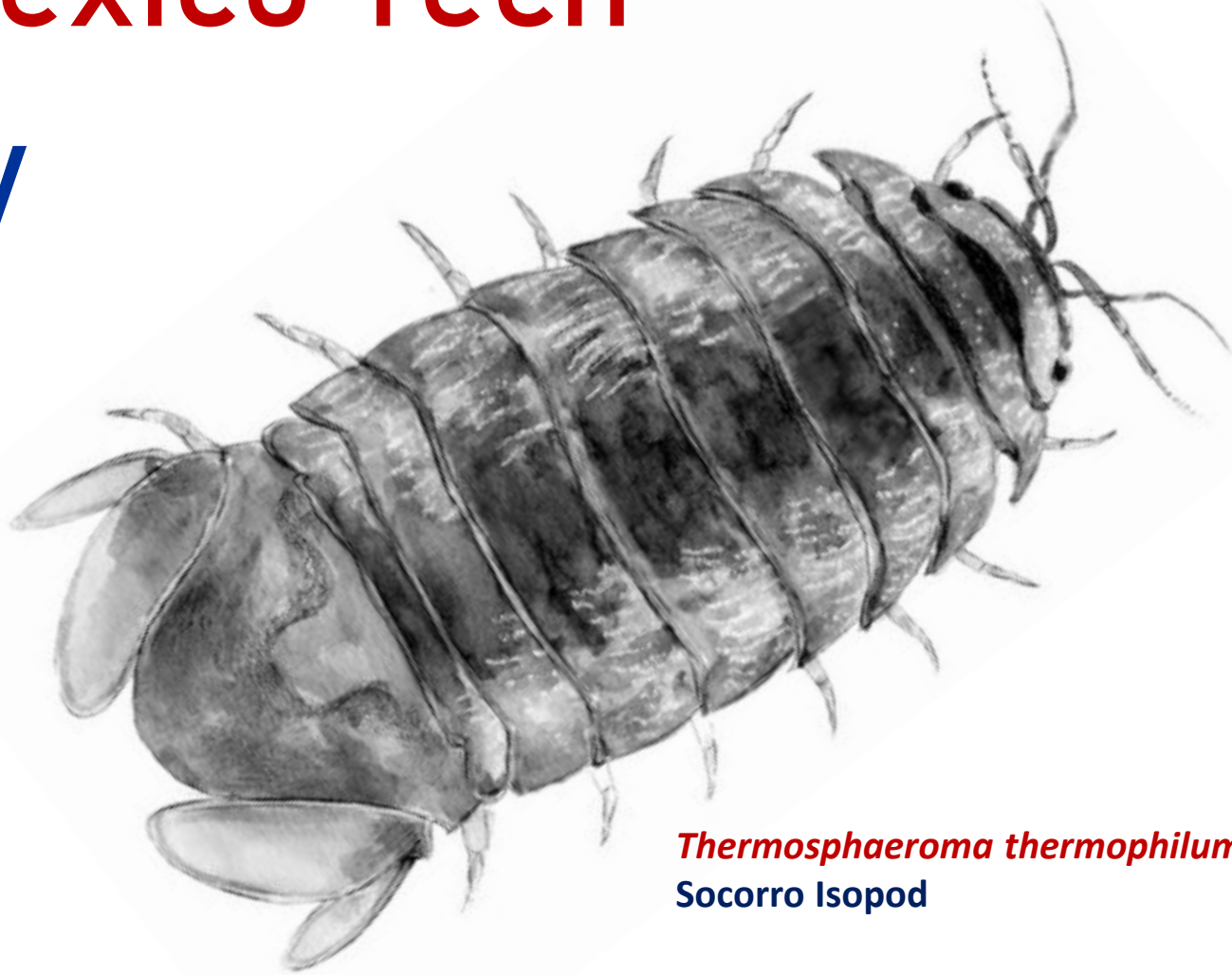
David Lightfoot
Steve McBride

Ryan Darr
Carrie Parris



New Mexico Tech

Biology



Thermosphaeroma thermophilum
Socorro Isopod

https://all-free-download.com/free-vector/download/tenebrionidae_54319.html

Tenebrionidae line drawing

<https://bugguide.net/node/view/1178220>

Aeolus livens

<https://bugguide.net/node/view/932913/bgpape>

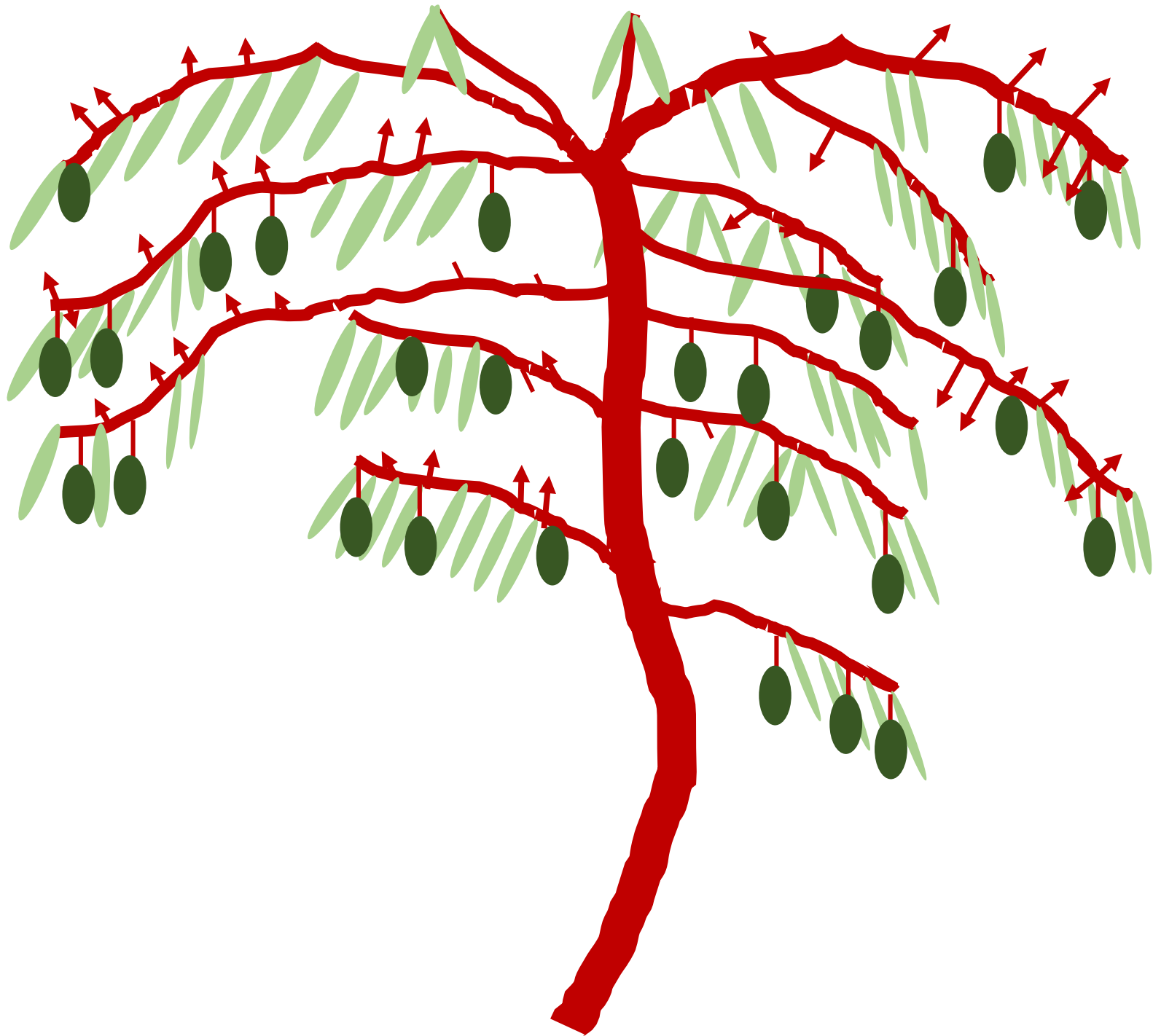
Callathus opaoulus

<https://www.monaconatureencyclopedia.com/armadillidium-vulgare/>

Armadillidium vulgare

<https://www.thorninger.net/eng/Noctuidae.html>

Noctuidae



$>PO_4^{3-}$
in cottonwood

