Abundance and Diversity of Soil Arthropods

Soil Arthropods

- Diversity of vegetation plays a role in abundance and diversity
- Plant species (leaf litter) provide a favorable habitat and food resources
- Leaf litter quality can affect soil arthropod abundance and diversity

Woody Trees

- Valley Oak (*Quercus lobata*)
  - Deciduous
  - Sandy light soil with grass
  - No leaves on tree
- Coast Live Oak (*Quercus agrifolia*)
  - Evergreen
  - Canopy
  - Dark soil with leaf litter

Hypothesis

Abundance and diversity of arthropods will be greater under evergreen (coast live oak) than under deciduous (valley oak)
Hypothesis Two
Abundance and diversity in the compass directions (N S E W) will vary more under the deciduous (coast live oak) because it is not protected by a canopy.

Study Site
- American River Parkway, Sacramento, CA
- Mediterranean climate
- Riparian vegetation
- Alluvial soils

Methods
- Soil samples collected under 3 trees of each species (evergreen and deciduous)
- Four samples/tree collected at N, S, E, W compass directions
- 24 soil samples collected, 12 under each type of tree

Methods
- Soil arthropods extracted with a Tulgren funnel
- Soil arthropods were identified & counted in each sample
Data analysis:

Student's t-test used to compare:

- Abundance (total amount of individuals)
- Diversity (counts of species)

Between evergreen versus deciduous

Results - Abundance

$t(0.05, 22)= 0.23, P= 0.16$

Results - Diversity

$t(0.05, 22)= 0.18, P= 0.86$

Analysis Two

An ANOVA was used to compare:

- Abundance (total number of individuals)
- Diversity (counts of species)
- Mite Diversity (counts of mite species)

Between compass directions for evergreen and deciduous
Results - NSEW Abundance

Evergreen: $F(0.05, 11)= 0.81$, $P= 0.52$

Deciduous: $F(0.05, 11)= 3.37$, $P= 0.08$

Results - NSEW Diversity

Evergreen: $F(0.05, 11)= 0.34$, $P= 0.79$

Deciduous: $F(0.05, 11)= 1.81$, $P= 0.22$

Results - NSEW Mite Diversity

Evergreen: $F(0.05, 11)= 0.41$, $P= 0.75$

Deciduous: $F(0.05, 11)= 1.33$, $P= 0.32$

Summary

Our tests showed

- No difference in abundance or diversity between the tree species
- No difference in abundance and diversity in the compass directions for either tree
Discussion

- Leaf litter quality may not differ enough between evergreen and deciduous oaks to make a difference in arthropods
- Position around a tree does not affect soil arthropods

Discussion

If we had...
- larger sample size
- measured moisture level
- analyzed organic matter
  - Nitrogen and amino acids
- measured temperature