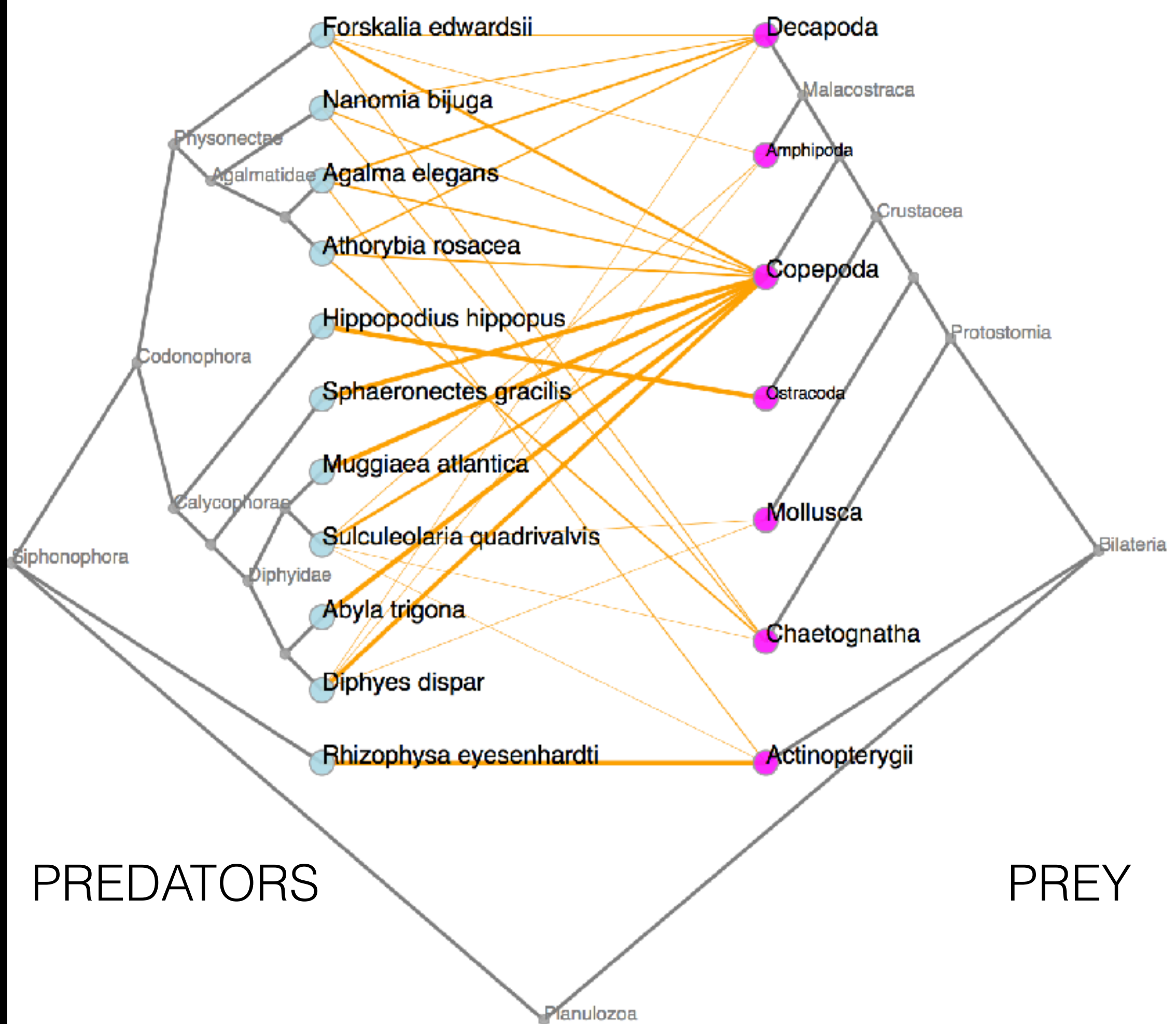


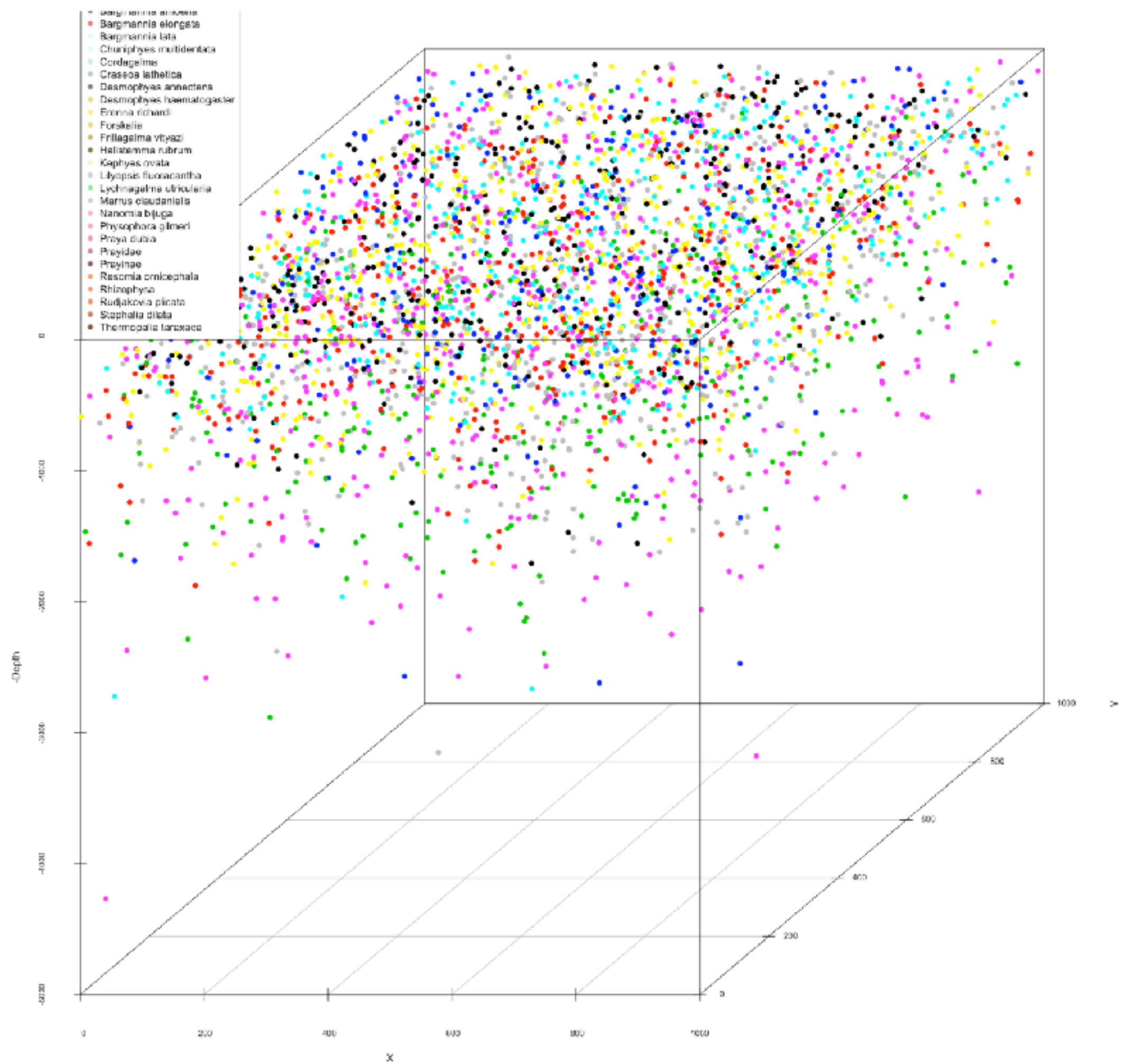
# Expected Predator-Prey Interactions From Co-Distribution

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Computational Analysis of Spatial Data

# The Problem:

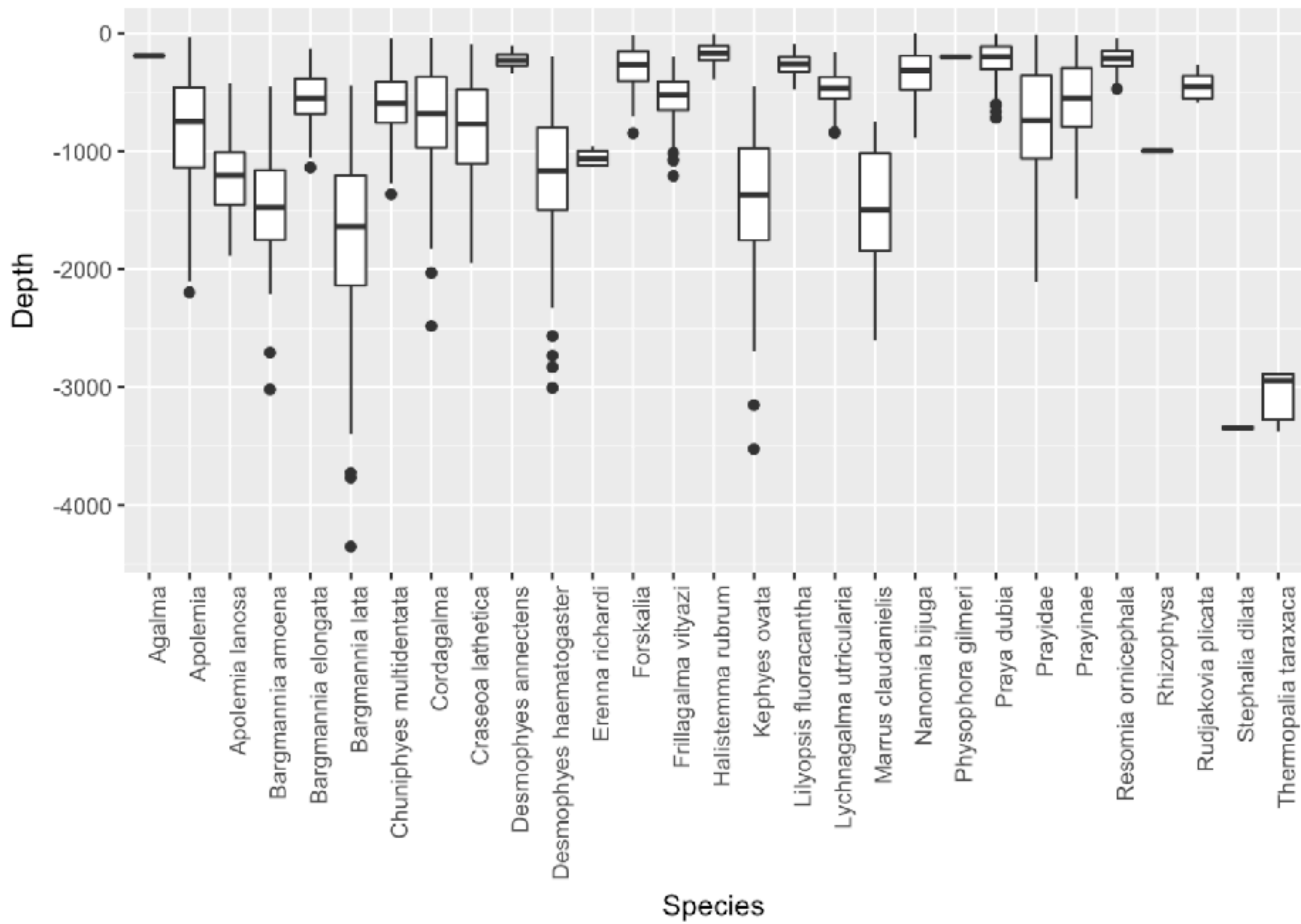
- I study siphonophore (predator) diets (interactions with prey)
- Partitioning variance:
  - ★ How much of diet is due to BIOLOGY
  - ★ How much of diet is BOTTOM-UP determined by co-occurrence of prey





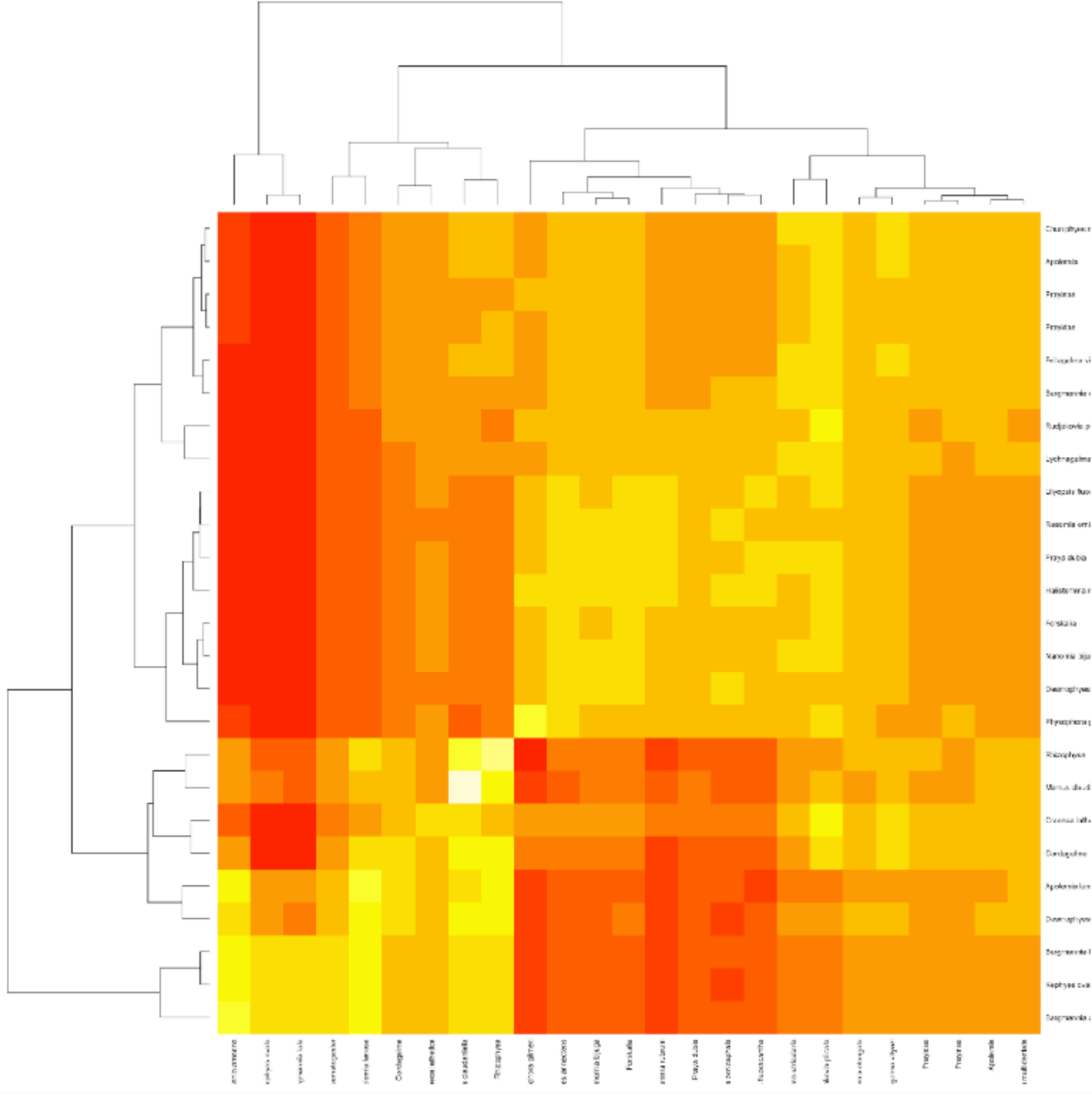
# The Data

- ROV annotated observations:
  - ★ Siphonophores
  - ★ Prey
- Reliable Z (depth) positions in water column
- Reliable abundances
- Unreliable horizontal positions
  - ★ Except: Sparse transect data (can calculate patchiness)



# The Goal

1. Calculate distance distributions between different planktonic taxa.
2. Calculate relative encounter probabilities for each pair of siphonophore-prey species.
3. Estimate an expected dietary covariance matrix for siphonophore species pairs given their distributions relative to prey



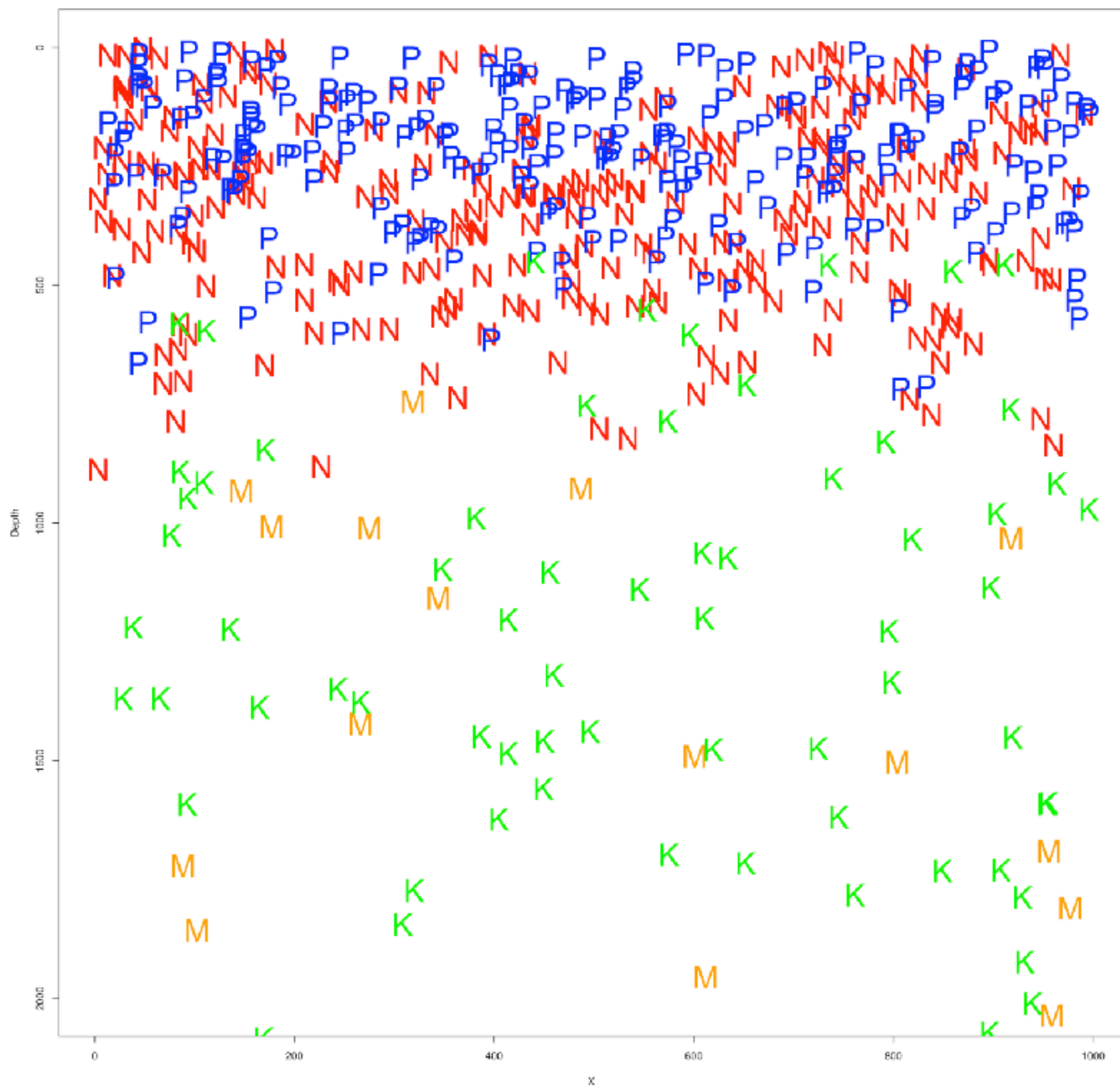


# Do XY positions matter?

- If the XY positions are ultimately randomized, does it matter?
- Can a 1D universe give a good relative estimate?

# How To Simulate Patchiness?

- Simulate XY positions:
  - ★ Non-normal, not 100% random either
  - ★ With different levels of “clusteredness”



# Best Way to Estimate Relative Co-Occurrence Probability?

- Euclidean Distances?
- What other spatial statistics (neighbor distance, spherical contact...) would be more appropriate?
- Best test for spatial correlation?