How residence time constrains diversity

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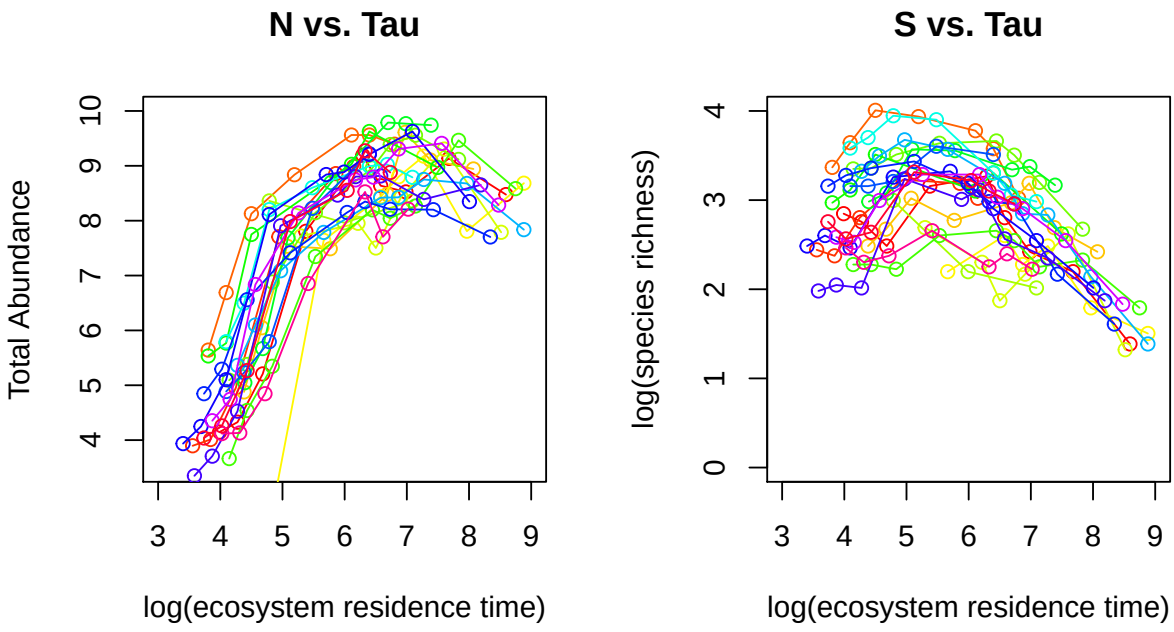
INTRODUCTION

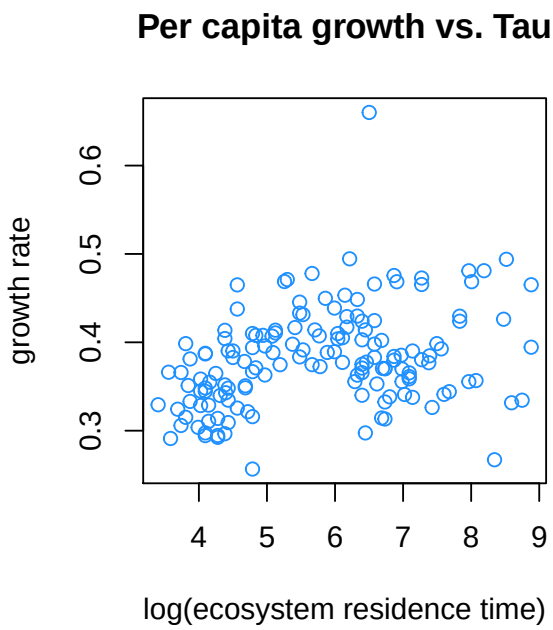
Here, we explore the influence of mean cell residence time, hydraulic residence time, and particle residence time on abundance, local (α) diversity, physiology, and resource availability and diversity.

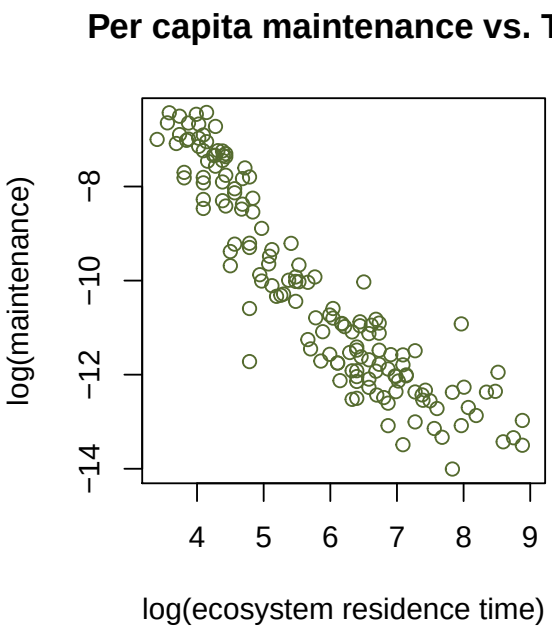
These simulations

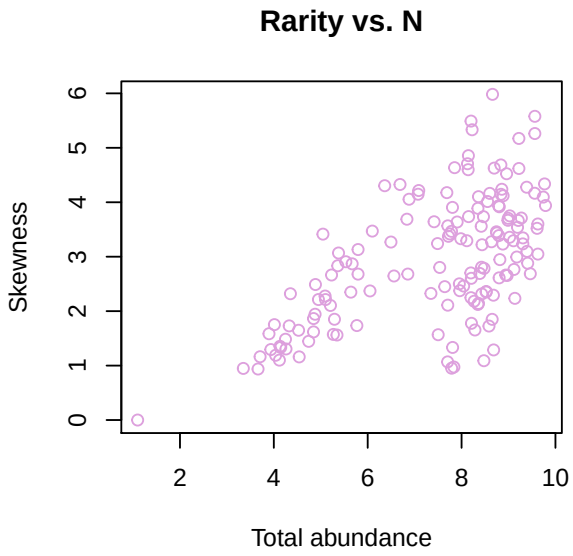
```
## Load Data
sim.data <- read.csv("~/GitHub/hydrobide/results/simulated_data/2015_June/18_June_3/SimData.csv")
sim.data <- subset(sim.data, motion == ' fluid ')
```

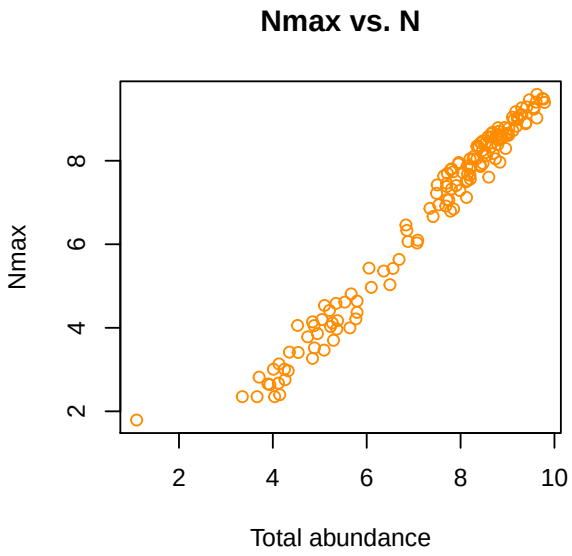
Univariate relationships

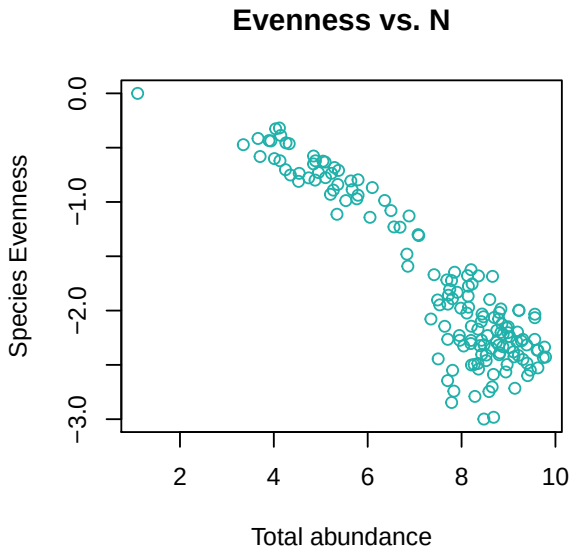


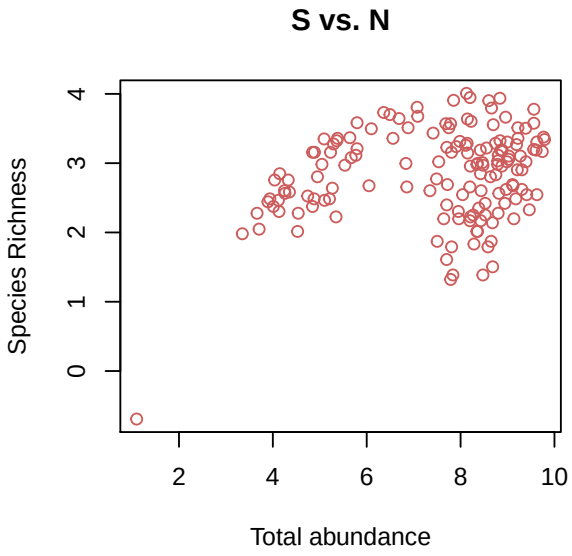

Per capita growth vs. Tau
growth rate
0.3
0.4
0.5
0.6
4
5
6
7
8
9
log(ecosystem residence time)

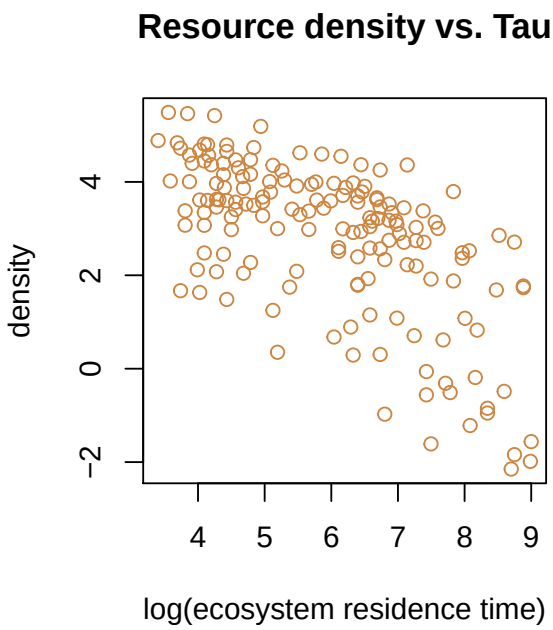

Per capita maintenance vs. Tau
log(maintenance)
−14
−12
−10
−8
4
5
6
7
8
9
log(ecosystem residence time)

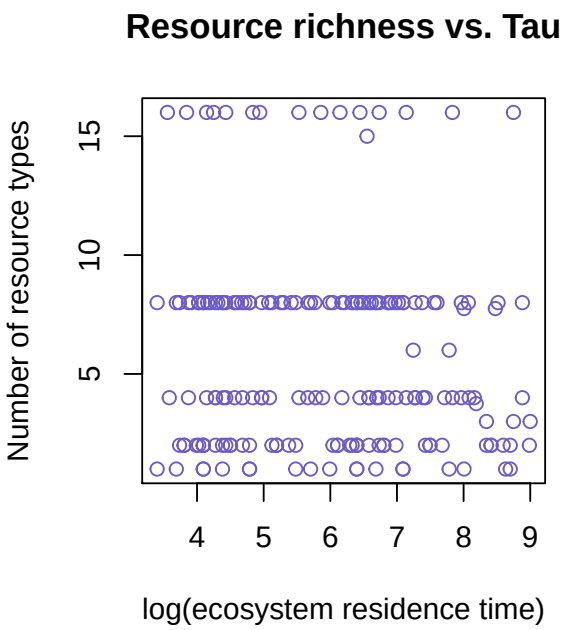

Rarity vs. N
Skewness
0
1
2
3
4
5
6
2
4
6
8
10
Total abundance


Nmax vs. N
Nmax
2
4
6
8
2
4
6
8
10
Total abundance


Evenness vs. N
Species Evenness
−3.0
−2.0
−1.0
0.0
2
4
6
8
10
Total abundance


S vs. N
Species Richness
0
1
2
3
4
2
4
6
8
10
Total abundance


Resource density vs. Tau
density
−2
0
2
4
4
5
6
7
8
9
log(ecosystem residence time)


Resource richness vs. Tau
Number of resource types
5
10
15
4
5
6
7
8
9
log(ecosystem residence time)