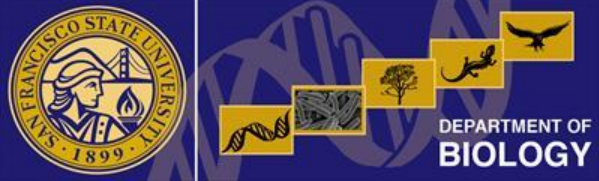


Performance variation in *Leptasterias* spp. among populations and habitats

Caleb Shaw, University of New Hampshire, STAR intern

Cohen Lab, Romberg Tiburon Center, San Francisco State University



Background

- *Leptasterias* brood their young and juveniles disperse by crawling away.
- Low dispersing species can be used as a local indicator of environmental health.
- Important to monitor effects of wasting disease and climate change.



Image: Laura Melroy

Rock and Pool Stars



Image: Laura Melroy



Image: Laura Melroy



Objectives



- Is behavioral variation between microhabitats a reflection of genetics?
- Test for differences in performance between habitat types.
 - Is righting response a good measure?
- Develop a comparable field and lab protocol.

Field Methods

- Individuals were collected from Pigeon Point.
- Flip tests were performed in the field and temperature was recorded.
- Stars were collected for the lab.

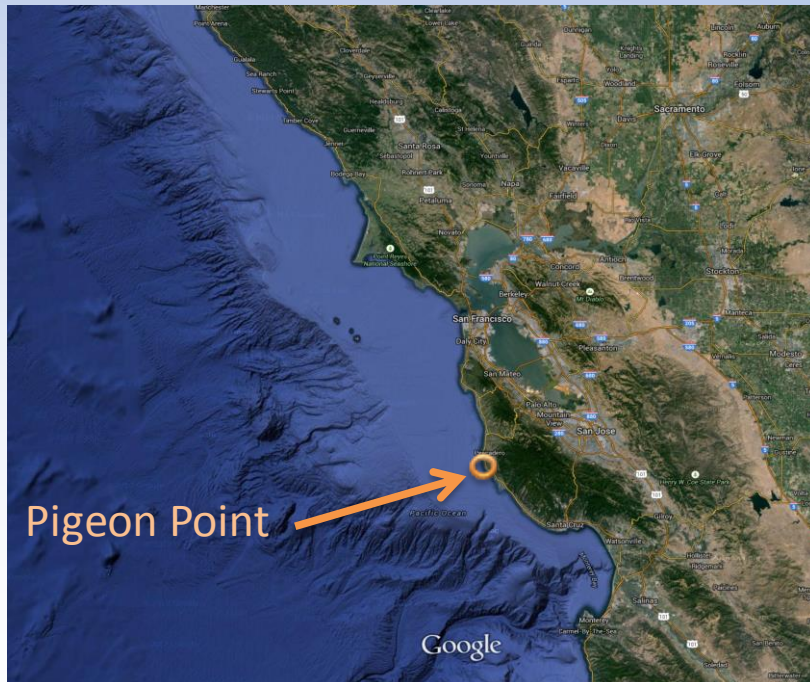


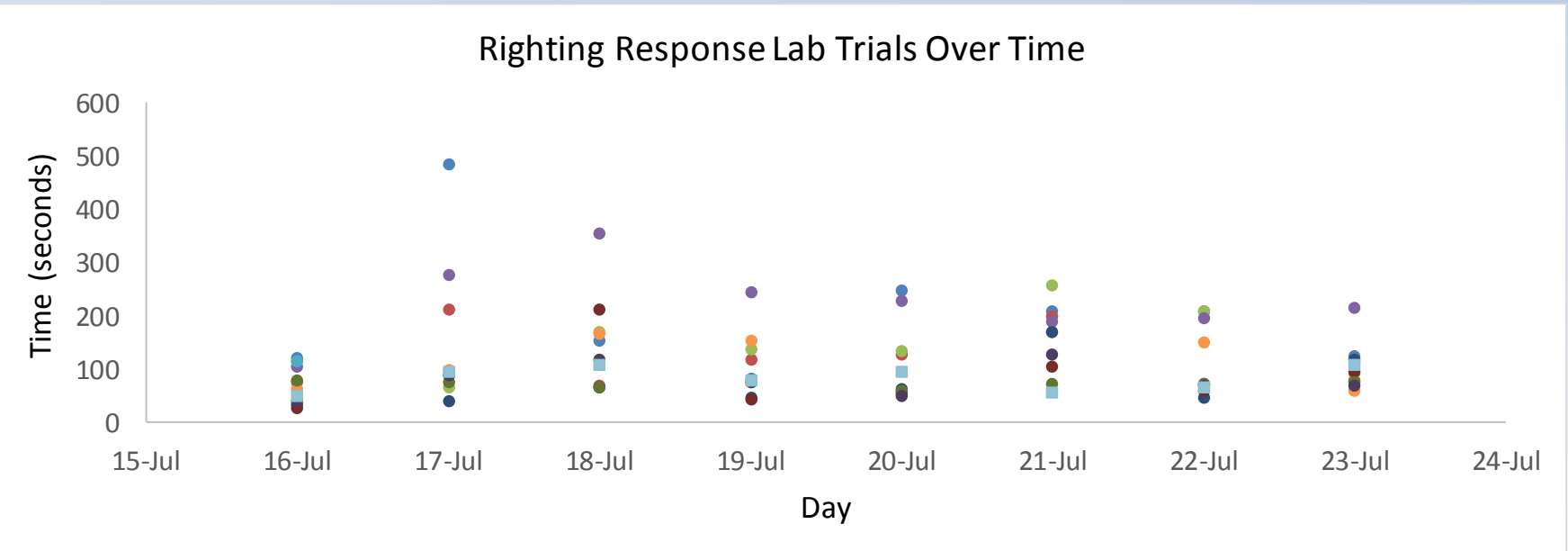
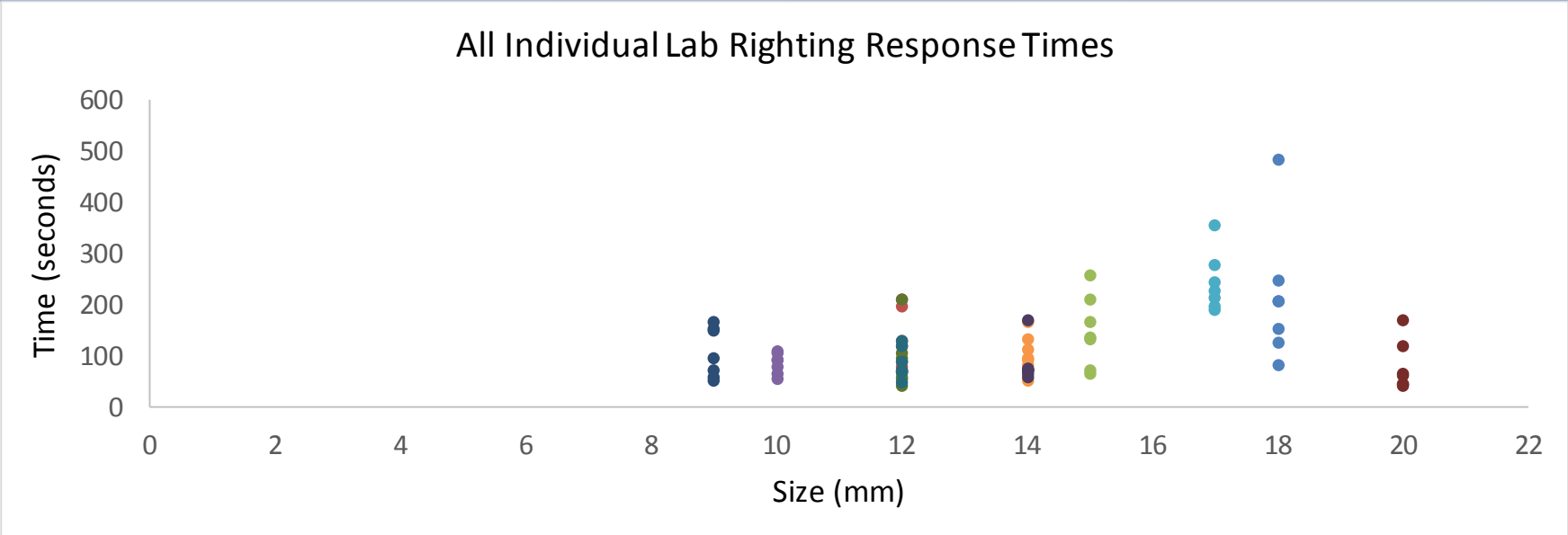
Image: Janet Bair

Lab Protocol

- Collected stars were kept in divided tanks at constant temperature and salinity.
- Stars were starved for a day before trials and starved throughout.
- Flip tests were performed in a separate tank at the same temperature.

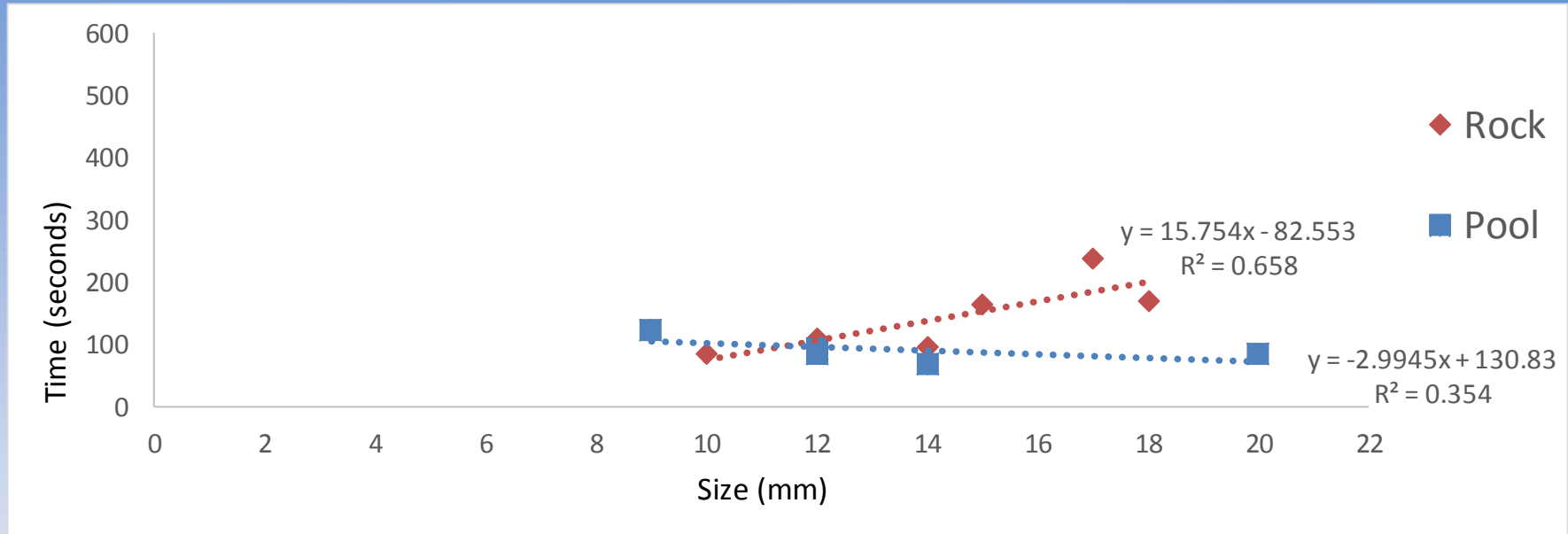


Variation in Lab Righting Response Times

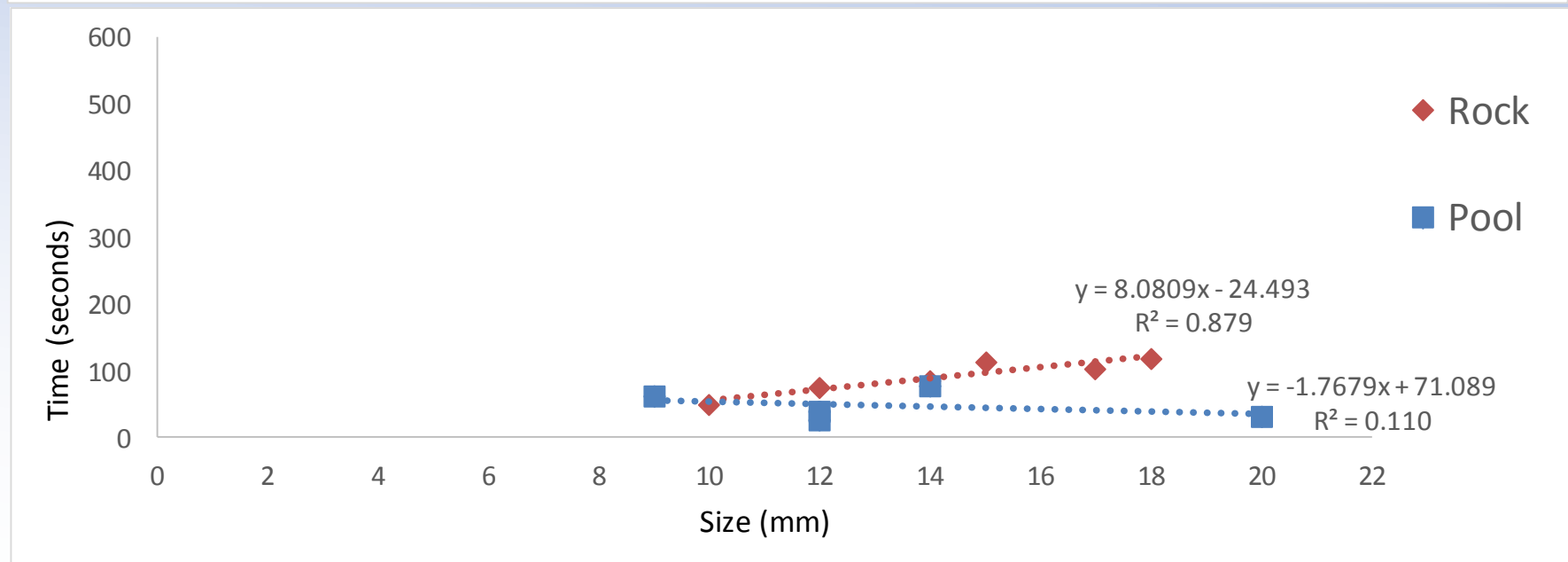


Initial Comparisons: Rock Stars Seem Have Slower Flip Times Than Pool Stars

Lab

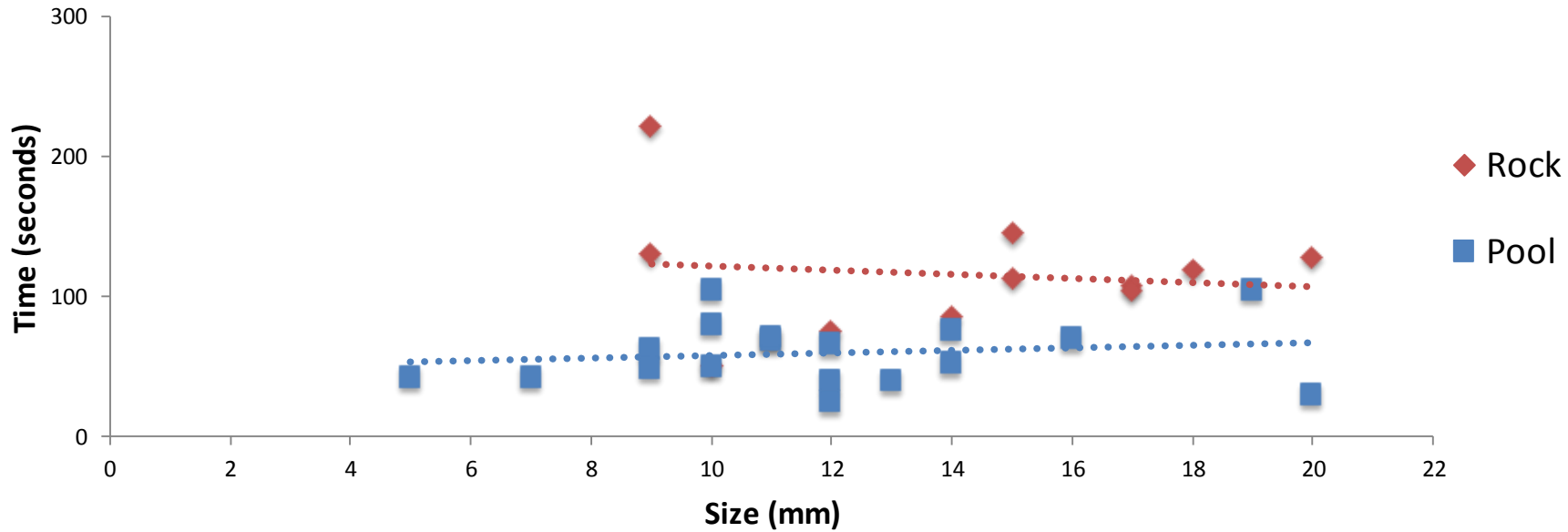


Field



Further Investigation: Evidence Supports Behavioral Differences Between Groups

Field

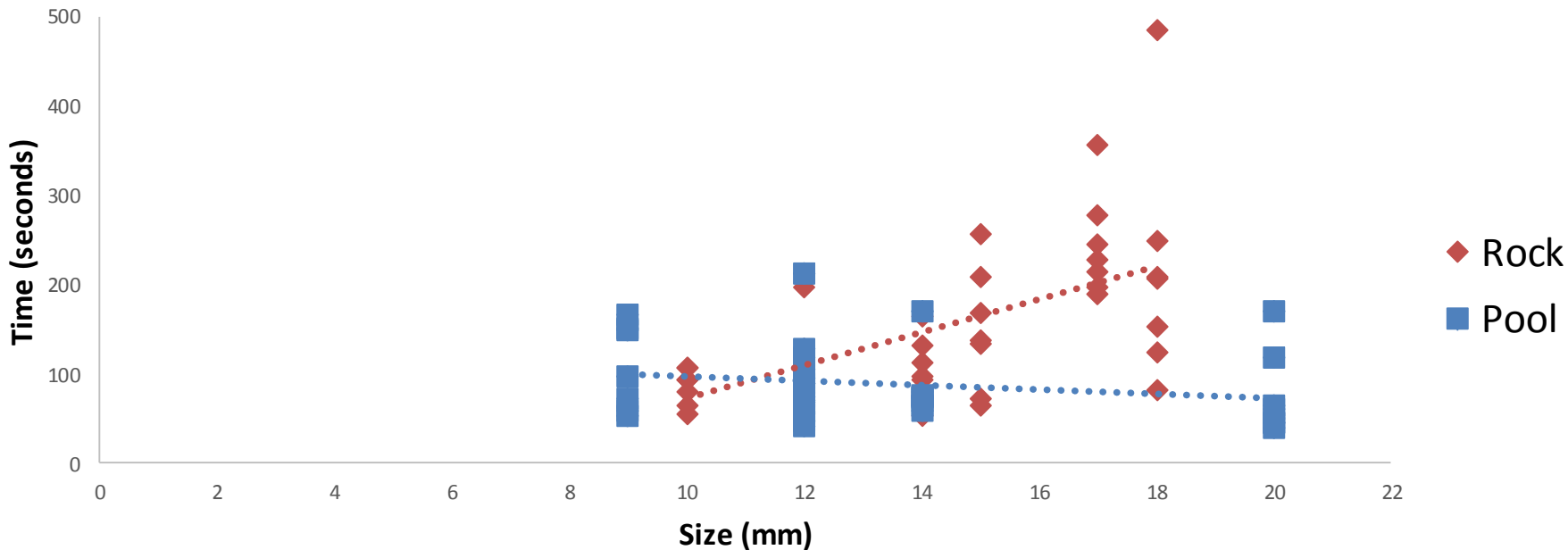


ANCOVA:

Significant difference in time $\rightarrow p = 0.0002$

No significant effect of size $\rightarrow p = 0.5109$

Lab

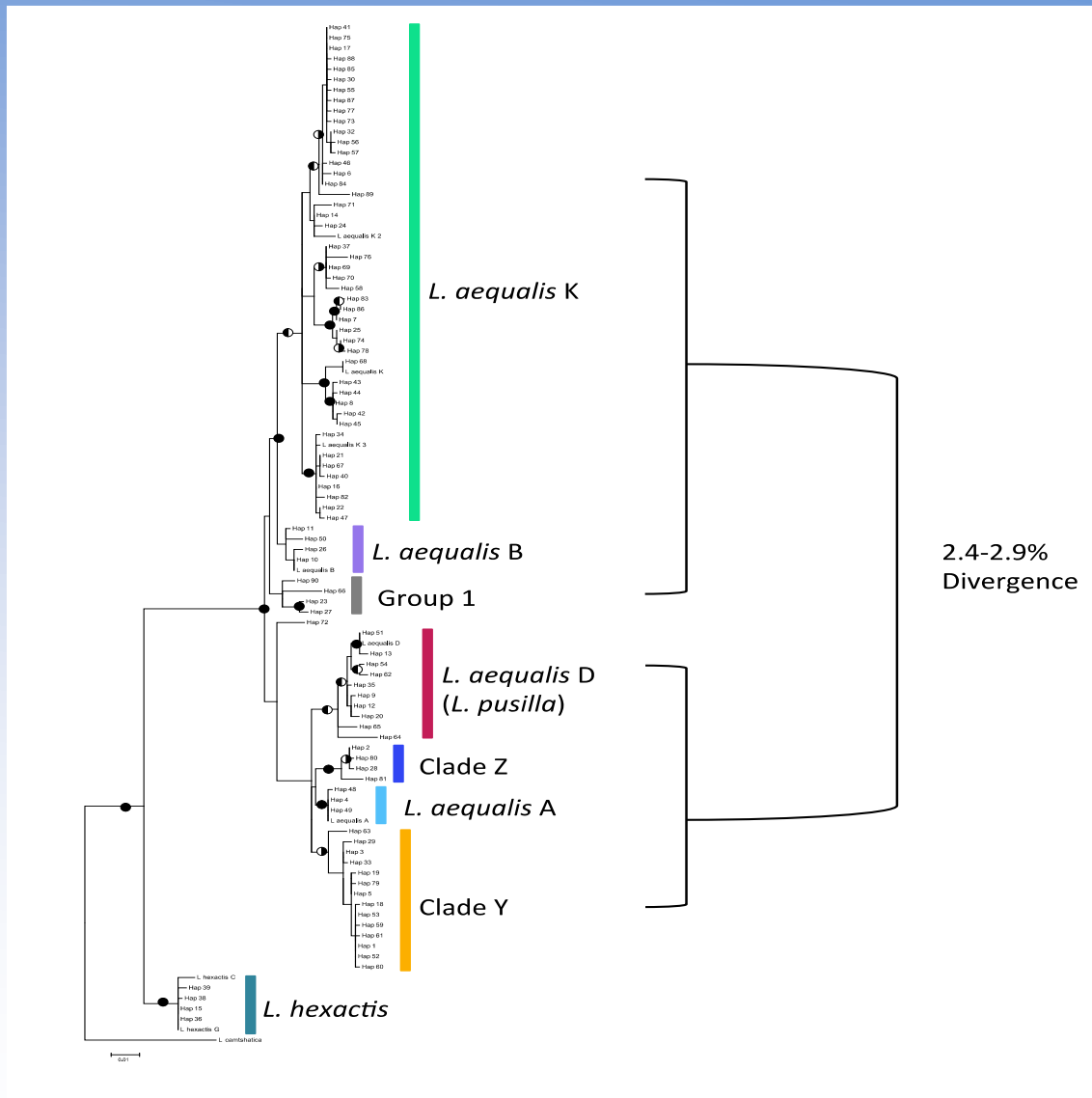


ANCOVA:

Significant difference in time $\rightarrow p = 0.0005$

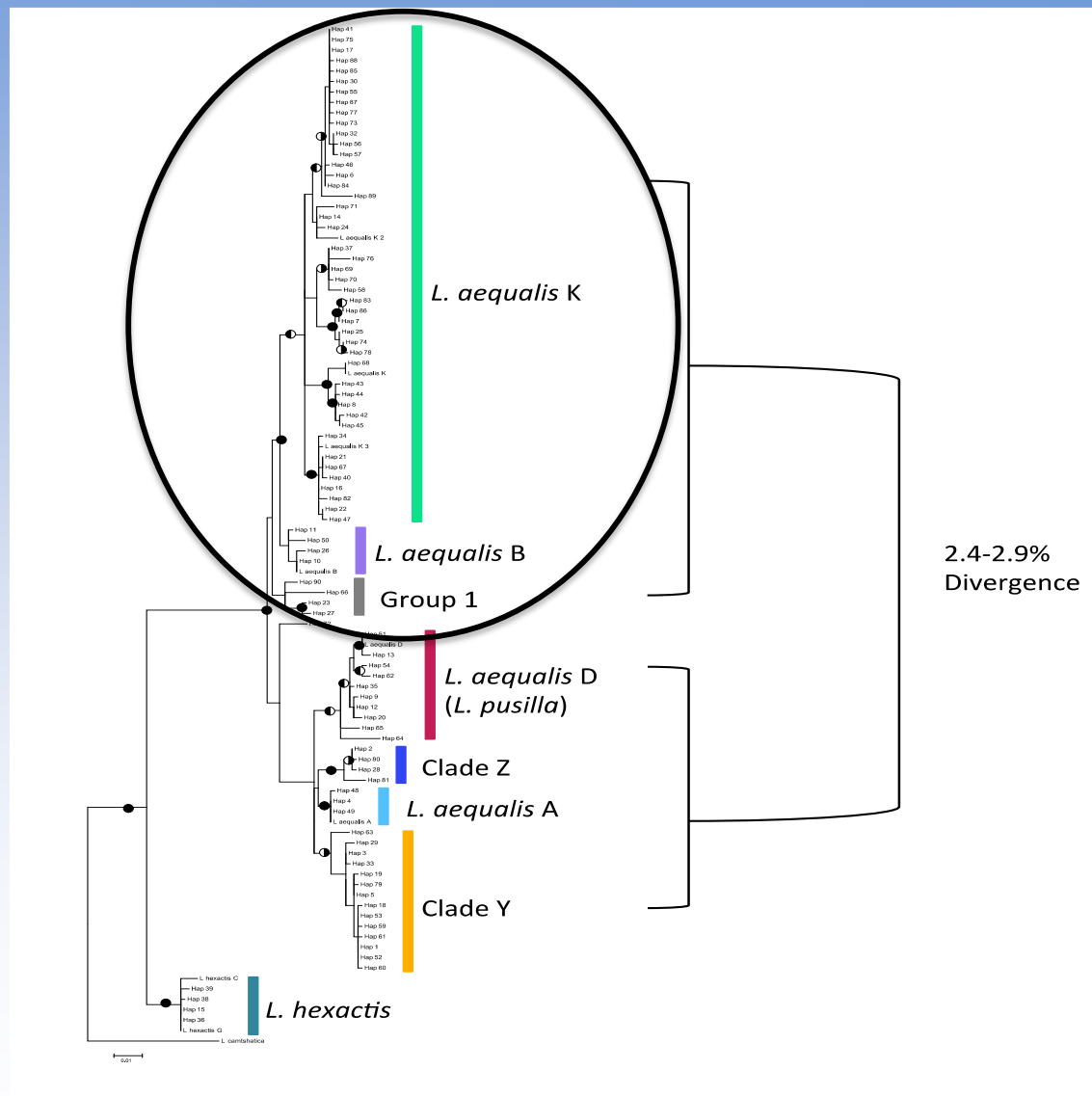
There IS a **significant** effect of size $\rightarrow p < 0.0001$

Genetic Comparison of Pigeon Point Rock and Pool Stars



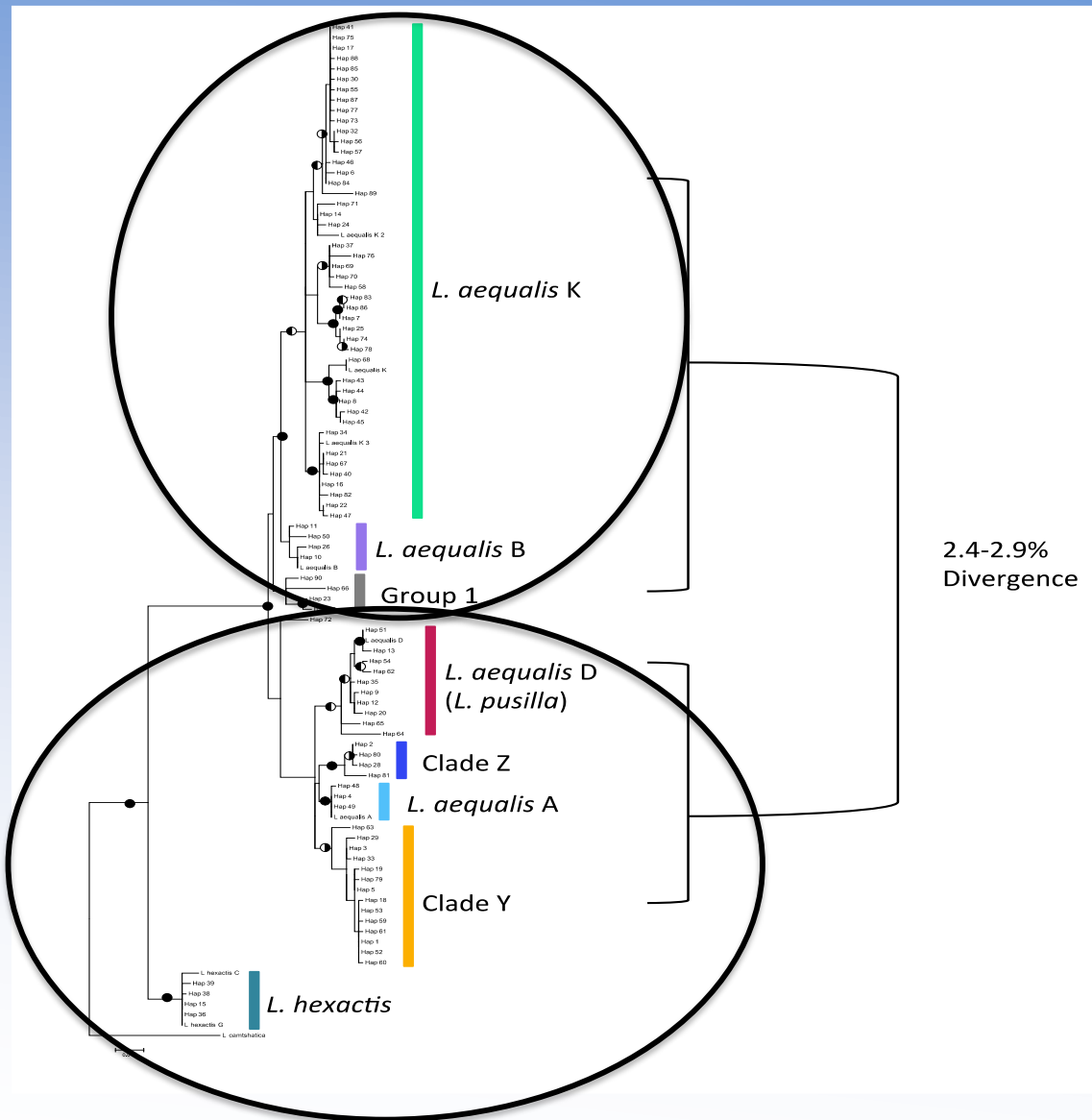
Clade	Habitat
B	rock
A*	rock
K	rock
K	rock
A*	rock
D	rock
D	pool
K	pool
K	pool
K	pool
K	pool
K	pool
K	pool
K	pool
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Genetic Comparison of Pigeon Point Rock and Pool Stars



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K	pool
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K	pool
K	pool
K	pool
K	pool

Images and genotyping: Laura Melroy

There May be Behavioral Differences Among Habitat Preference

- Species level genetic differences may be associated with behavioral variation and habitat distributions.
- Variation in flipping time is associated with habitat differences.
- Flip time variation between habitat sites persisted in lab for a week.
- If righting response is to be used:
 - Stars should be starved.
 - Multiple flips should be performed.
 - Should be a wide range of sizes.

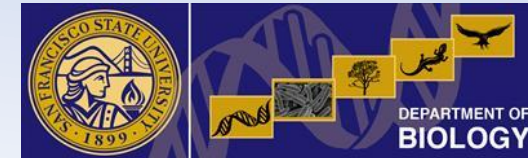


Further Questions

- How do differences in temperature affect the two types of stars?
- Do rock and pool stars always stay as a rock or pool star?
- Are rock and pool stars anatomically similar, do they have the same biomass ratio?
- Are there behavioral personalities in individual stars?

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- RTC and SFSU
- STAR program and administration, mentors, and colleagues.



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