Why Coral Reproduction Matters

• Value of coral reefs
• Human impacts
  – Realized
  – Potential
• Question:
  – How will these ecosystems react/adapt to further human activities?
Synchrony

- Yearly, lunar, and daily
  - Focus on lunar periodicity
- Adaptive for broadcasters
- Brooders, like *Porites*:
  - Optimal time?
  - Predator satiation?

Fan, et al., 2002
Sites:
Rim and Patch Reefs
Larval Release

- Water flow
- Light control
- Containers
- Air supply
- Collection
Settlement

- Tiles
  - Conditioning
  - Crustose Algae

- Settlement Tank

- Wetbench Tank
  - Growth Monitoring
Sizing

- Spat growth
- Planula size
Results: Lunar Periodicity

Proportion of Planulae Released over the Lunar Cycle

Average Proportion of Total Release

Lunar Day

Note: Error bars represent standard error throughout.
Results: Lunar Periodicity

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Results: Lunar Periodicity

Proportion of Planulae Released over the Lunar Cycle

Average Proportion of Total Release

Lunar Day

Note: Error bars represent standard error throughout.
Planula Size

• Rim planulae are larger than patch planulae (t-test, 2-tailed, \( p < 0.001 \)).
Planula Size

• Planula size increases over the course of the lunar release cycle.

Planula Size Vs. Lunar Day

- R² = 0.40399
- p < 0.001

Patch

Rim

Linear (Overall)
Zooxanthellae

• There is no significant difference between the average zooxanthellae density of patch and rim corals (t-test, 2-tailed, p = 0.696).
Zooxanthellae

• There is also no trend in zooxanthellae density over the lunar cycle.

Zooxanthellae Density Vs. Lunar Day

R² = 0.028
p = 0.370

- Linear (Overall)
- Patch
- Rim
Spat Growth

• Week 1: Rim corals are larger than patch, but without significance (t-test, 2-tailed, $p = 0.092$).
• Week 2: Rim significantly larger ($p = 0.004$).
• Growth between Weeks 1 and 2 can be observed for neither patch ($p = 0.982$) nor rim ($p = 0.613$) corals.
Conclusions

• Lunar periodicity
  – Patch/rim differences

• Planulae
  – Lunar trend and adaptation

• Zooxanthellae
  – Density in planulae is perhaps not an environmental adaptation.
  – Difference in clades? Further work is called for.

• Growth
  – Rim larger than patch
  – More data is needed to show growth trends.
Questions?

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Citation: