



Amino acid supplements can improve the growth of corals after fragmentation

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Background:

As more coral species become threatened by mass bleaching and disease, coral aquaculture has been growing in efforts to restore species diversity and populations in the wild. Fragmentation is a common technique used to rapidly increase coral growth and reproduction, but it can leave the corals weak and susceptible to higher rates of mortality.



We used amino acid treatments on various coral species to observe and analyze how their growth was affected after fragmentation. This project aims to improve the efficiency of *ex situ* coral propagation by reducing mortality rates and increasing growth post-fragmentation.

Methods:

- 4 species groups: *Pseudodiploria clivosa*, *Pseudodiploria strigosa*, *Orbicella annularis*, and two species of *Acropora*
- All underwent three treatments: 1. Control (no added amino acids), 2. treatment once after fragmenting and 3. weekly treatment after fragmenting
- “Treatment” consisted of a 30 minute amino acid bath
- Initial pictures were taken after fragmenting, and treatments continued for various weeks
- Imagej was used to analyze the difference in surface area along with significant growth between treatments



Figure 1. Initial and final pictures taken of individual A3 from the weekly treatment.

Results:

Species B avg. daily surface area

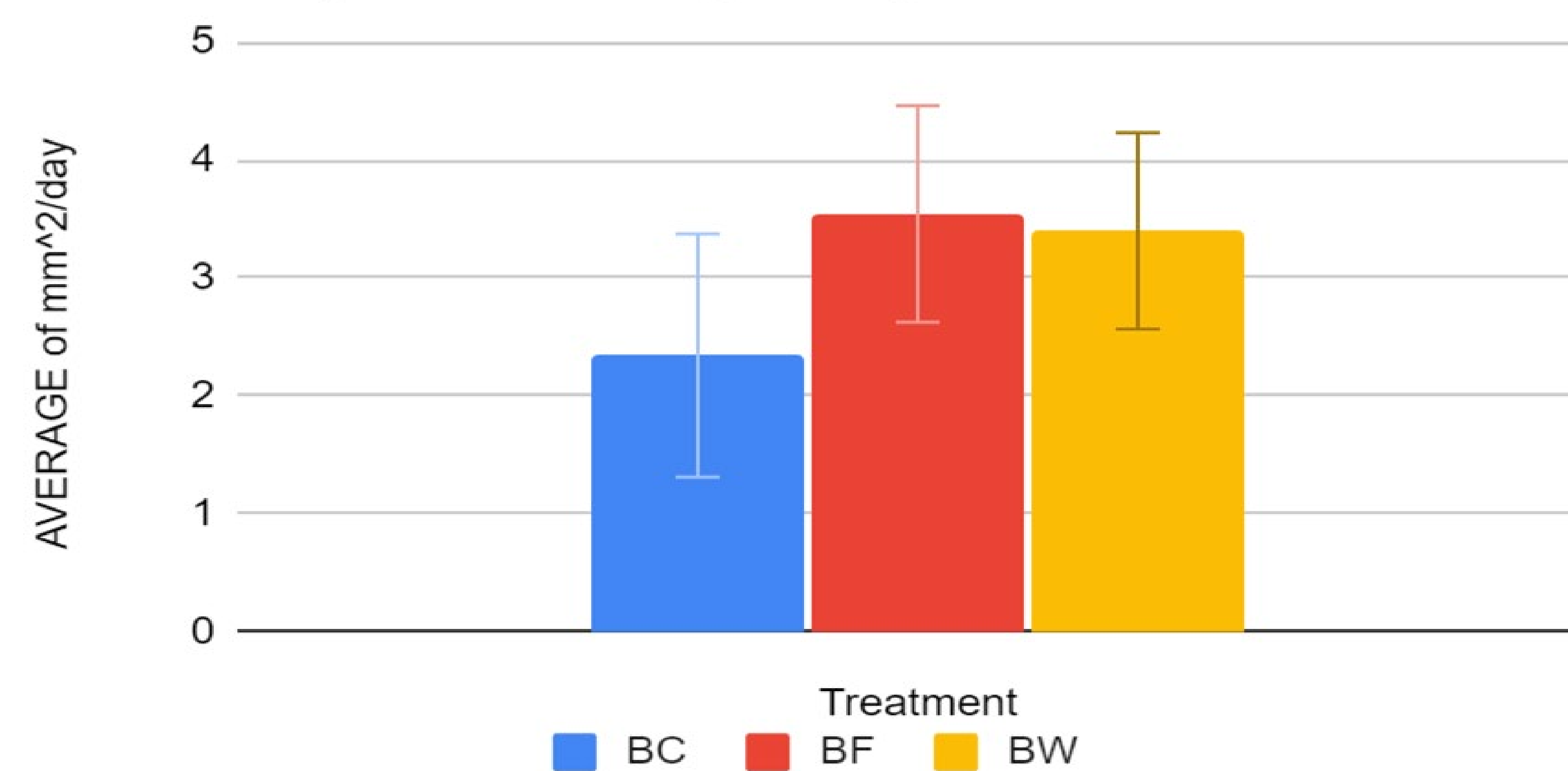


Fig 2. Surface area comparison for *P. strigosa* (species B)

- *P. strigosa* showed significant increase in growth after the once and weekly treatments when compared to the control group
- *P. clivosa* had the most overall growth but no significant difference between the treatments
- *Acropora palmata* displayed 100% mortality for the control treatment
- For the *A. palmata*, the once and weekly treatments showed 60% and 20% mortality respectively

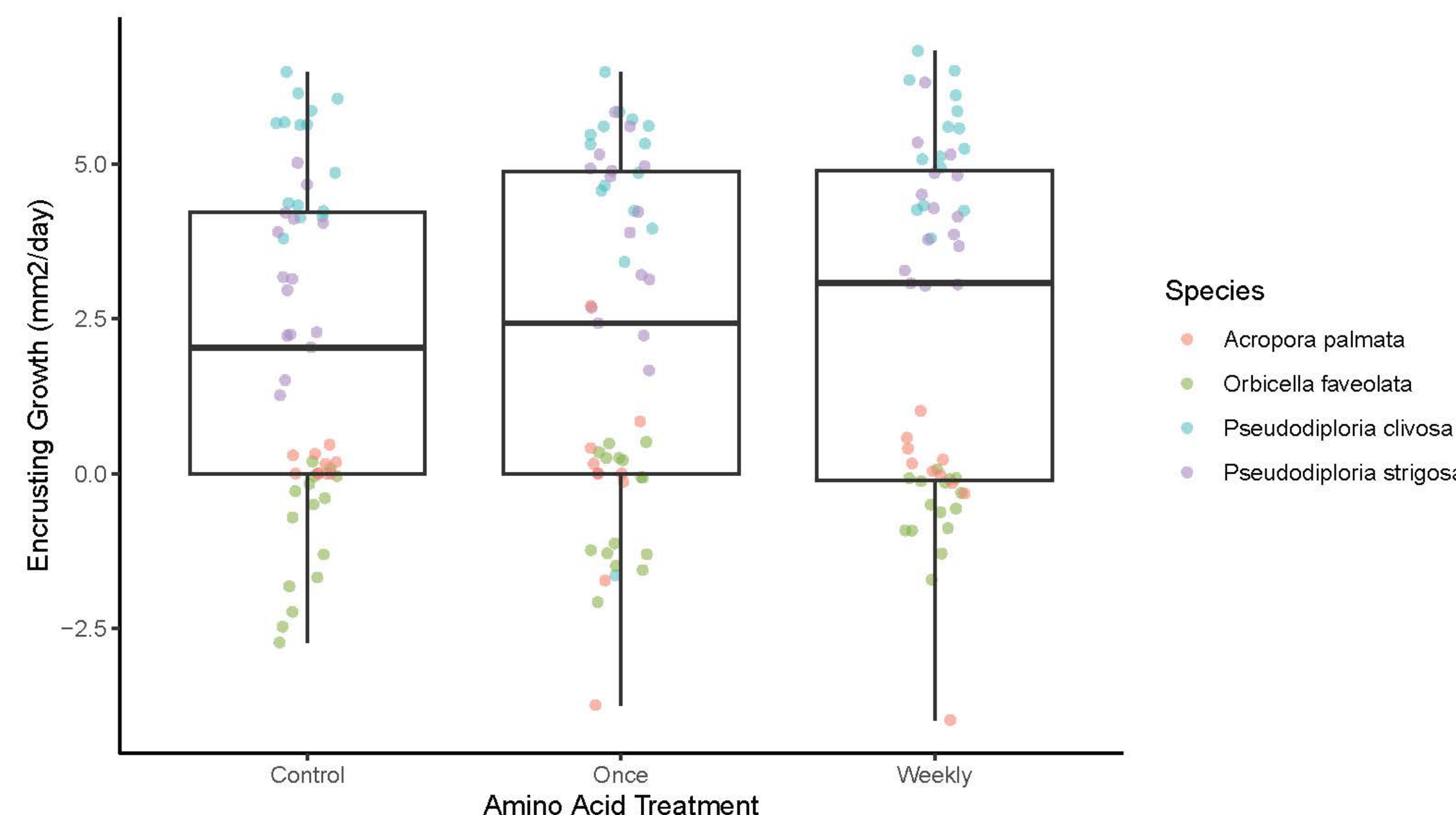


Fig 3. Box plot displaying species individuals' growth per day between treatments

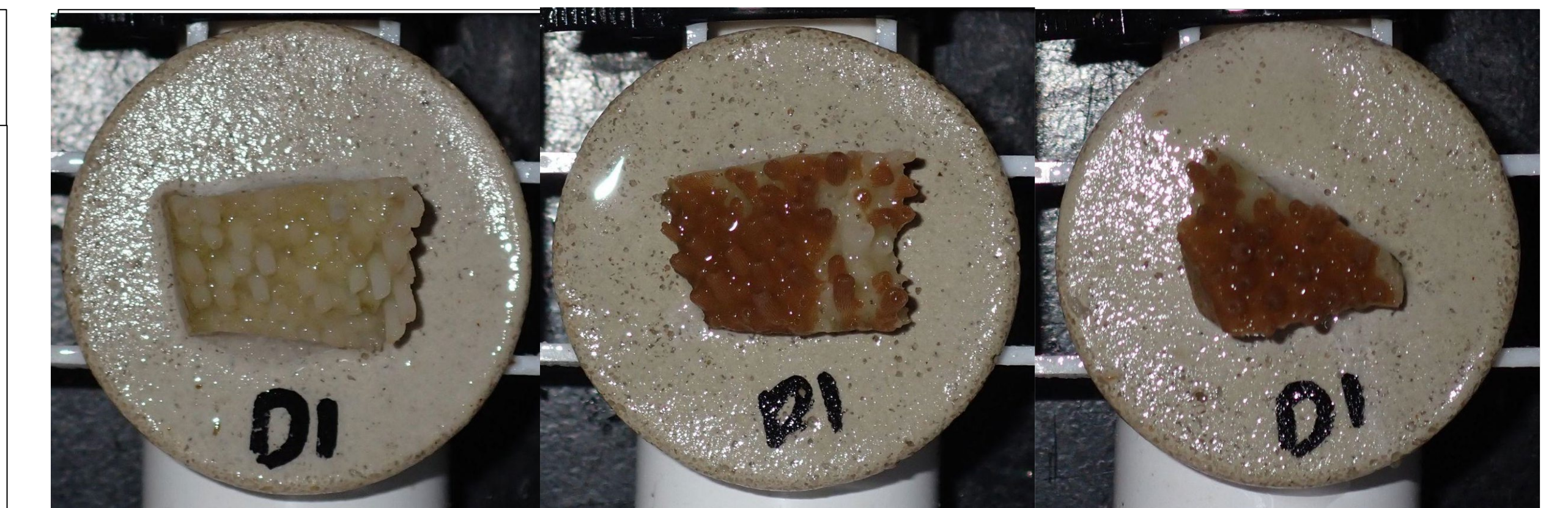


Fig 3. Comparison of treatments for *A. palmata*: control (left), once (middle) and weekly (right)

Conclusions:

- Amino acid baths may assist in decreasing mortality rates after coral fragmentation
- Recurrent amino acid bath does not affect growth after the first treatment post-fragmentation
- Amino acid solution may improve growth in certain species, specifically bouldering corals

Future Directions:

- Conduct a study under stricter conditions, with differing amounts of amino acids
- Future research about the protein structures of corals during growth and how to improve efficiency
- Implement amino acid bath protocol in labs after fragmentation
- Observe the effects of amino acids on recovering bleached corals

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