The Effects of Benzo-a-pyrene on the Growth Rates of Scleractinian Corals: Pocillopora damicornis and Porites hawaiiensis



By Brandon Watson, C-more Scholar Intern Mentored by Dr. Robert Richmond Kewalo Marine Lab 12/10/08

Scleractinians:

*Phylum: Cnidaria

Class: Anthozoa

Order: Scleractinia (stony corals)

*Pocillopora damicornis:

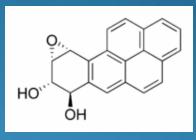
- *Hermatypic
- *Planulae larvae brooder
- * Monthly planulation
- *Good mobility
- *Approximately 1.6 mm

*Porites hawaiiensis:

- *Ahermatypic
- *Planulae brooder
- *Daily/ weekly planulae brooder
- *Negatively buoyant larvae
- *Approximately .8 mm

Benzo-a-pyrene: BaP (C₂₀H₁₂)

- *A hydrocarbon derived from coal and gasoline products.
- *Known carcinogen
 - *Terrestrial: Burning coal, run off, illegal dumping, etc...
 - *Marine: Boats, spills, etc...



<u>Dimethyl sulfoxide:</u> (C₂H₆OS)

*A carrier solvent used in experiments to reduce volatilization of benzo-a-pyrene and to distribute it in the filtered salt water proportionally.

*Pocillopora damicornis:



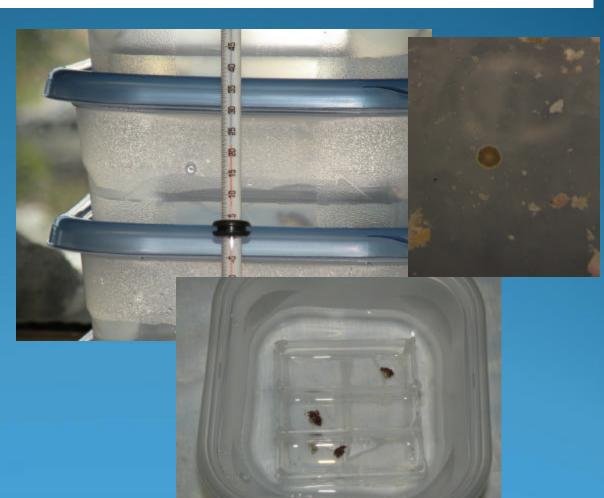
*Porites hawaiiensis:



*Pocillopora damicornis:



*Porites hawaiiensis:



Larval Exposure:

*Filtered sea water- Filtered with a 2 micron filter

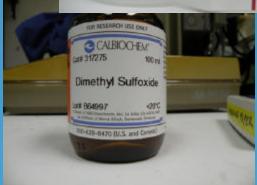
*Benzo-a-pyrene-

Concentration A- 1 micro gram per liter Concentration B- 2 micro gram per liter

*DMSO- .1% per liter (weight/ volume)

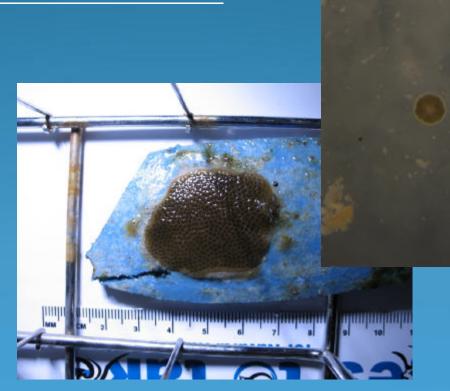


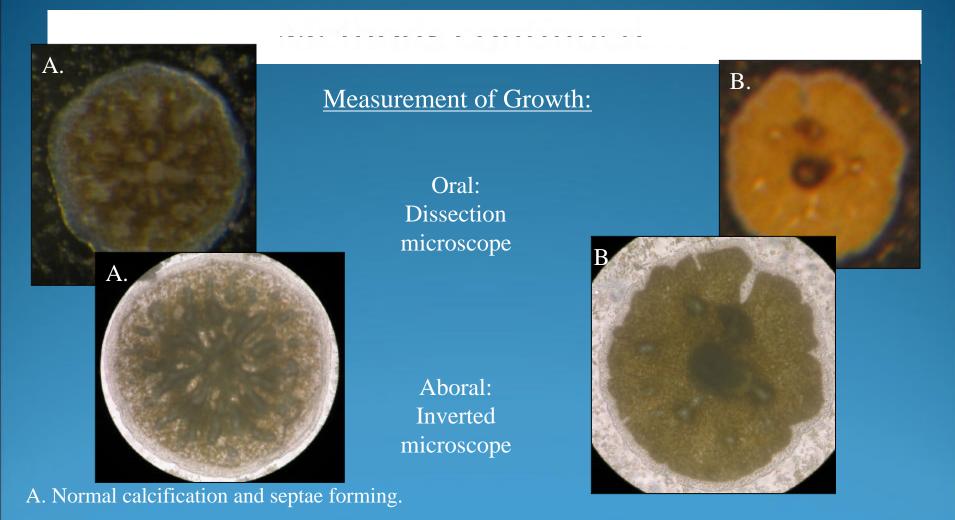




Modes of Measurement of Growth:

- *Image J:
- *Surface area
- *Calcium carbonate
- * Calyx formation





B. Reduced calcification and septae formation and discontinuous radial formation.

*Pocillopora damicornis

*Porites hawaiiensis

*Pocillopora damicornis

*Porites hawaiiensis

Larval Exposure: No data collected <u>yet</u>.

*Pocillopora damicornis needs more larvae collected and settled.

*Porites hawaiiensis is ready to be exposed to:

Two controls: filtered sea water and filtered water plus DMSO.

Two experiments:

A:1 microgram/l benzo-a-pyrene plus .1% DMSO per liter.

B: 2 microgram/ l benzo-a-pyrene plus .1% DMSO per liter.

Pocillopora damicornis:

- *One settled out of fifty.
- *Died due to hyper saline conditions exposed. in settlement chamber.(not covered container, 26 Celsius)

Porites hawaiiensis:

- *Twenty planulae larvae settled and metamorphosed.
- *Due to high rate of planulation on a daily basis.
- *Improved experiment (covered container, 21 Celsius)

- *At what salinity does planulae larvae die?
- *At what temperature does planulae larvae die at?
- *What is the primary mode of dispersal for *Porites hawaiiensis*, short and long range?





Kewalo Marine Lab:

Dr. Robert Richmond

Jon Martinez

Luc Rougee

Sean McDuff

Sean Knutson

C-more Program:

Dr. Barbara Gibson

Barb

Kim Wheersling

Kate

Castro, Peter, and Michael E. Huber. <u>Marine Biology</u>. New York: McGraw-Hill Companies, The, 2007. 307-19.

Dubinsky, Z., ed. Coral Reefs. St. Louis: Elsevier Science, 1990. 133-96.

Gulko, David. <u>Hawaiian Coral Reef Ecology</u>. Grand Rapids: Mutual LLC, 1999. 59-90.

