Assessment of Invasiveness of the Orange Keyhole Sponge *Mycale armata* in Kāneʻohe Bay, Oʻahu, Hawaiʻi.

Second Year

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Summary- First Year’s Findings

- *Mycale armata* occurs in low to moderate abundance throughout South and Central Kaneohe Bay, maximum in vicinity of Coco. Is.

- Although *M. armata* can appear a major component of the benthos, maximum density found was about 10% (mean 6.5%) at Reef 4, near Coconut Island, and decreased in all directions.

- Quarterly growth of *M. armata* on permanent quadrats variable, but showed sig. annual increases on both control & removal quadrats. Conversely, total coral showed general coverage decreases.
2\textsuperscript{nd} Year Objectives

• Repeat Photo Transect measurements at 11 of the 2004-2005 Sites to determine whether measurable change (Measurements scheduled for September)

• Repeat quarterly measurements of sponge and coral cover at remaining 8 Control and Removal Quadrats.

• Train DLNR/DAR Invasive Species Response Team in methods and analysis as a potential monitoring project

• Investigate alternative methods of control and management
Results: Permanent Photo Quadrats

Control Quadrats:

Removal Quadrats

-Removal required
12.6-22.7 hr/m² & killed
0.18-1.72 kg coral/m²
as “bycatch”
Control Quadrats:

- All of 9 remaining increased in *Mycale* cover ($Mn=+13.1$)**
- 8 of 9 remaining decreased in coral cover ($Mn=-16.3$)**

Removal Quadrats:

- All of 8 remaining increased in *Mycale* cover ($Mn=+10.2$)*
- 6 of 8 remaining decreased in coral cover ($Mn=-6.3$) n. s.
Control Quadrats:

- All of 9 remaining increased in *Mycale* cover \( (Mn=+13.1) ** \)
- 8 of 9 remaining decreased in coral cover \( (Mn=-16.4) ** \)

Removal Quadrats:

- All of 8 remaining increased in *Mycale* cover \( (Mn=+10.2) * \)
- 6 of 8 remaining decreased in coral cover \( (Mn=-6.3) \)

Conclusion: *Mycale* increasing in cover where it already occurs, recovers at about same rate when removed
Control Quadrats:
- 5 of 8 remaining increased in Mycale cover (Mn=+4.4)
Control Quadrats:

- 5 of 8 remaining increased in *Mycale* cover ($M_n=+4.4$)
- 6 of 8 remaining decreased in coral cover ($M_n=-14.8$).
Control Quadrats:
- 5 of 8 remaining increased in *Mycale* cover ($Mn=+4.4$)
- 6 of 8 remaining decreased in coral cover ($Mn=-14.8$).

Removal Quadrats:
- 4 of 8 remaining increased in *Mycale* cover ($Mn=+6.2$)
- 6 of 8 remaining decreased in coral cover ($Mn=-7.1$)
Control Quadrats:
- 5 of 8 remaining increased in *Mycale* cover (Mn=+4.4)
- 6 of 8 remaining decreased in coral cover (Mn=-14.8)

Removal Quadrats:
- 4 of 8 remaining increased in *Mycale* cover (Mn=+6.2)
- 6 of 8 remaining decreased in coral cover (Mn=-7.1)
Sponge Cover

Mycale - Quarters 5 and 6

\[ y = 1.011x - 1.67 \]

\[ r^2 = 0.97, \ p < 0.001 \]

CPCe Analysis Comparisons
Sponge Cover

$y = 1.011x - 1.67$

$r^2 = 0.97, p < 0.001$

CPCe Analysis Comparisons

Coral Cover

$y = 0.82x + 6.38$

$r^2 = 0.79, p < 0.001$
Investigate alternative methods of control and management

- Establish 2 new sets of photoquadrats & test a more efficient method of sponge removal using “Supersucker”
Alternate Method: Sponge removal using blasting of compressed air

(Initial idea from Steve Carroll, Southern California Marine Aquarium Society)
Air Blasting after mechanical removal
March 6
Pretreatment
(3.8 hrs/ m²)

Quadrat 11

Quadrat 12
Air Blasting after mechanical removal
March 6
Pretreatment
(3.8 hrs/ m²)

May 17

Quadrat 11

Quadrat 12
Air Blasting after mechanical removal
March 6
Pretreatment
(3.8 hrs/ m²)

May 17

Aug. 4

Quadrat 11

Quadrat 12
Air alone
1.4 hr/m²
Quadrat 13-1
Quadrat 13-2
Quadrat 14-1
Quadrat 14-2
May 17 Pretreatment
Air alone
1.4 hr/m²

Quadrat 13-1

Quadrat 13-2

Quadrat 14-1

Quadrat 14-2

May 17 Pretreatment

July 10
New Removal Quadrats - *Mycale*

*Mycale* Changes following air Blasting
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