Eradication of *Actinodiscus nummiformis* in Hawaii

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Biology

- Anthozoan that resembles sea anemones
- Class: Anthozoa
  - Order: Corallimorpharia
  - Family: Actinodiscidae
- Nutrition: zooxanthellae
- Reproduction: sexually and asexually
- Range: Indo-Pacific and South Pacific
In Hawaii

- First seen in December 1997 in small boat harbor
- Believed to be intentionally introduced for aquarium trade
- Potential aggressor
  - Space limitations
  - Degraded reefs
  - Hardy organism
- Symbionts? Diseases?
Invasive corallimorphs

- *Rhodactis howesii* in Palmyra
- Covers 2000 x 1000 m
Rules and Regulations in Hawaii

- Illegal to possess
- Illegal to introduce non-native species into any waters
- Department of Agriculture pursues legal aspect, Division of Aquatic Resources pursues eradication
- Deliberate releases: Court case and fine
Problems eradicating marine invasive species

- Not a closed system – hard to use chemicals
- Complex system we don’t fully understand
- Lack of effective methodologies
- Often not discovered until infestation is widespread
First and Second Eradication Attempt
2002-2003

- Division of Aquatic Resources and Department of Agriculture attempted eradication
- Chiseling substrate
- Plaster of Paris
- Colonies still intact
  - Could not continue eradication effort due to lack of man-power
AIS Team

- Turned over to Aquatic Invasive Species Team under DAR in May 2005
  - 5-person team: three technicians, intern, supervisor
- Small boat harbor was surveyed, found organisms in three discrete locations
- 45 colonies found
- Marked with transects
Third Eradication Attempt
August 2005

- Two days- Organisms removed with sledge hammers and chisels, or rubble with organisms attached was removed
- Placed in a water/bleach solution
- Disposed by Dept. of Agriculture personnel or designated representative
Before chiseling
After chiseling

Appears that organisms have been removed
New colonies intact

- Found 7 new colonies one week later
- Originally missed?
  - Spread by chiseling?
- Continued chiseling and surveying
- Needed new technique
Fourth Eradication Attempt

- November 2005, colonies were smothered with sandbags
- Select colonies smothered for test
- Bags were left for three weeks…
Colonies were still intact
Eradication attempt 4.5

- Sand was placed over colonies and smoothed out before sandbags were replaced for a better seal
- All colonies were covered
- Three weeks later…
SUCCESS!
Almost...

2 colonies of the 15 survived. Colonies were smothered again.
Before and after smothering
Area was surveyed weekly or monthly

Remaining colonies were removed or smothered
Three consecutive surveys over two months turned up no colonies, so surveys were conducted quarterly.
Number of Actinodiscus nummiformis colonies over time

Survey dates:
- 8/9/2005
- 10/9/2005
- 12/9/2005
- 2/9/2006
- 4/9/2006
- 6/9/2006
- 8/9/2006
- 10/9/2006
- 12/9/2006
- 4/9/2007

Number of Colonies:
- 50
- 45
- 40
- 35
- 30
- 25
- 20
- 15
- 10
- 5
- 0
Problems eradicating *Actinodiscus nummiformis*

- Poor visibility
- Initial eradication may have spread organism
- Health concerns
Why Successful?

- Slow-spreading
- Contained area
- Combination of methods
- Last survey conducted May 2008
- Believe we have a successful eradication

AIS team member **NOT** finding *Actinodiscus nummiformis*
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Questions?