

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



Thierry Work



Thierry Work

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



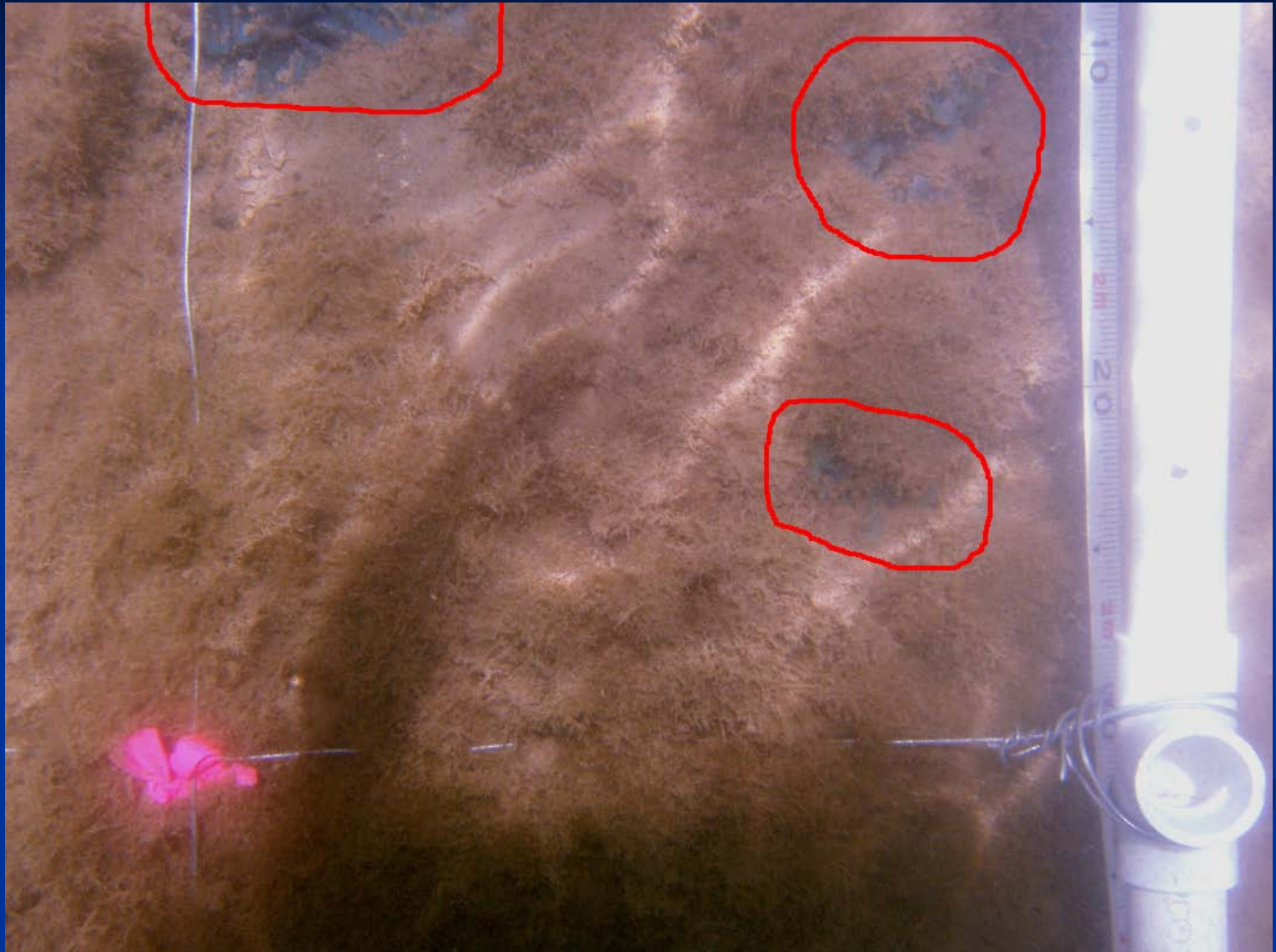
Third Eradication Attempt

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!

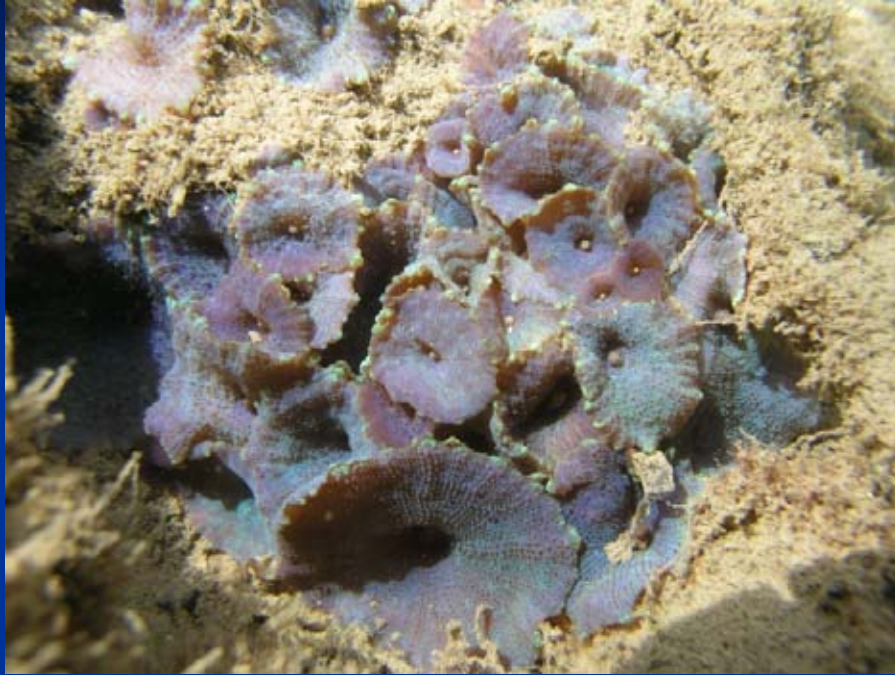


An underwater photograph showing a sandy seabed. A wooden handle of a tool, possibly a hammer or pickaxe, is visible at the top. A blue object, likely a piece of equipment or a marker, is on the sand. The text 'Almost...' is overlaid in the upper right.

Almost...

**2 colonies of the 15 survived
Colonies were smothered again**

Before and after smothering



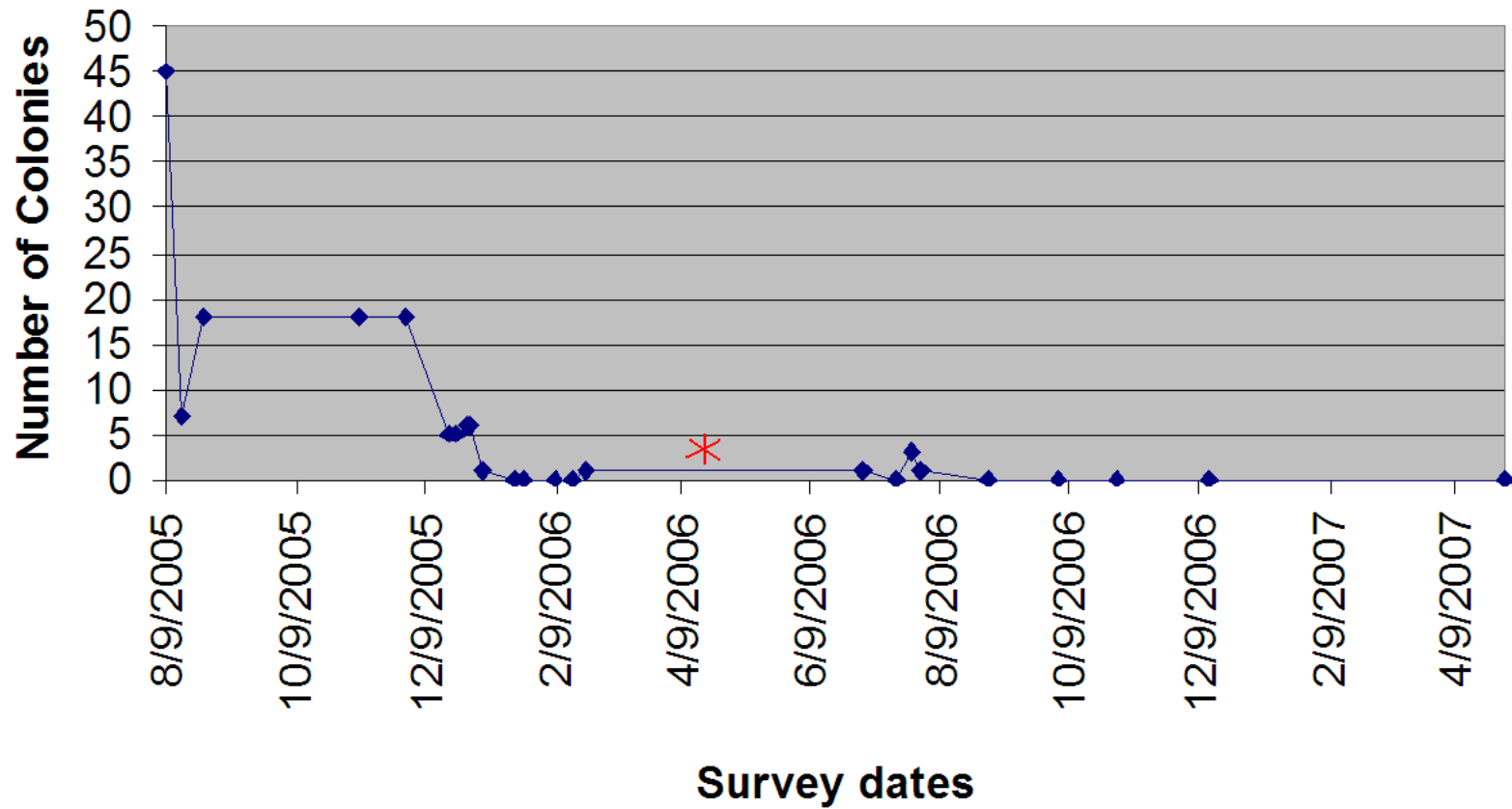
- Area was surveyed weekly or monthly
- Remaining colonies were removed or smothered



- Three consecutive surveys over two months turned up no colonies, so surveys were conducted quarterly



Number of Actinodiscus nummiformis colonies over time



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

Acknowledgements

- United States Geological Survey-National Wildlife Health Center
 - Thierry Work - Wildlife Disease Specialist
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 - Sara Pelleteri – Aquatic Invasive Species Coordinator
 - Paul Murakawa – DAR Biologist
 - Jason Leonard – Ballast Water and Hull Fouling Coordinator
 - Jamie Marchetti – Aquatic Invasive Species Technician

Questions?

