Behavioral Responses of Cultured White Abalone (*Haliotis sorenseni*) to Predatory Sea Stars in a Laboratory Experiment

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White abalone are threatened by low population densities.

Low densities lead to low reproduction rates.

Abalone are a coveted sea snail.

In the 1970’s, they were overfished.

White abalone are threatened by low population densities.
We’re finding the best method for introducing the captive bred white abalone to the wild.

Introducing captive bred abalone to the wild in protective cages.

Juvenile white abalone

Abalone Predators

Artwork from NOAA, BML, and Madi Clarke
Worries remain about the wellbeing of captive-bred white abalone in the wild.

- Do cultured white abalone exhibit **defensive responses** to a natural predator?
- Do these behaviors allow the white abalone to **escape** the predator?
- Can white abalone **learn** to escape more quickly after repeated exposure to a predator?
We compared reactions of abalone between a sponge and a sea star and between multiple exposures of the star

**Control:** Abiotic sponge

**Treatment:** Sea star

**Observation Period:**
- Exposure 1
- Exposure 2
- Exposure 3

Organism artwork by Madi Clarke
Abalone exhibit distinct behaviors to predators

Twisting is effective for an abalone’s escape

Less Extreme Responses
Resting – no reaction to stimulus
Clamping – abalone fastens to surface

Behavioral Responses
- **Epipodial spreading** - Abalone spread epipodial tentacles
- **Galloping** - Abalone moving in a certain direction
- **Shifting** - Abalone moving slowly, non-directionally
- **Twisting** - Shell rotates

Photos taken by Michael Ready
Mild reactions were observed longer in control trials

What does this mean?

They respond in more extreme ways when stimulated by a predator’s touch.
White abalone exhibit certain patterns in behavioral responses to predators.
Abalone exhibit evidence of learning

They escape quicker after just one exposure

The difference between the ranges highlight that there are more abalone escaping quicker in later trials.
What did we learn?

Do cultured white abalone exhibit **defensive responses** to a natural predator? **Yes!**

Do these behaviors allow the white abalone to **escape** the predator? **Yes!**

Can white abalone **learn** to escape more quickly after repeated exposure to a predator? **Yes!**
Keeping abalone wild

More Research

After this study

Public Outreach

Wild Population Restoration

Photos from Bodega Marine Lab

Abalone artwork by Anna Thomasdotter
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