



Extensions to a Novel Predator Aversion System Intended to Protect Nesting Endangered Least Terns *Sternula antillarum browni* at Venice Beach, CA

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Abstract

Extensions to a prototype predator aversion system using electric shock conditioning are described using both field and laboratory testing. Responses were recorded and analyzed using various recording equipment capturing digital photographs or video images. The major extension explored in this study is examining sensory cues (aside from touch) associated with using replica bait. The experiment in Venice Beach is further validated by understanding the interaction of *corvids* and replica bait.

Introduction

- Endangered California Least Terns (*Sternula antillarum*) have been reproductively unsuccessful at the Venice Beach Least Tern Nesting Site due to American crow (*Corvus brachyrhynchos*) predation since 2009 with the exception of 2014 (when study aversion techniques were first implemented).
- The initial prototype shocking system was developed and tested at Venice Beach California in the summer of 2014 (Velasco, 2015).
- Game camera footage and photography of the nesting site from 2014 unto the present have been analyzed and tagged.
- Live accounts of crows near the nesting site have been catalogued.
- The area continues to be monitored for crow activity.
- This extension focused on ensuring that replica bait is effective in baiting crows.
- Question:** Is the replica bait effective in attracting visitation while not undermining the system? Does it produce any deterring effects?
- Hypothesis:** The replica bait will produce normal initial visitation but lower visitation when the bait is realized to be not authentic

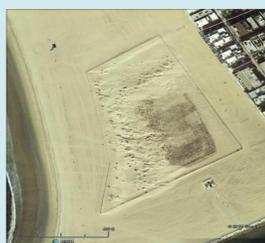


Fig 1. Photo of gated nesting area in Venice Beach, CA



Fig 2. Photo of placard at the gated site

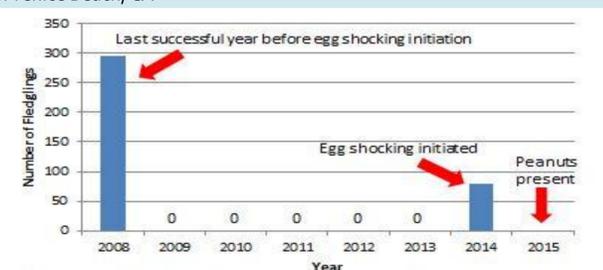


Fig 3. Recent reproductive output of Least Terns at the Venice Beach colony

Methods

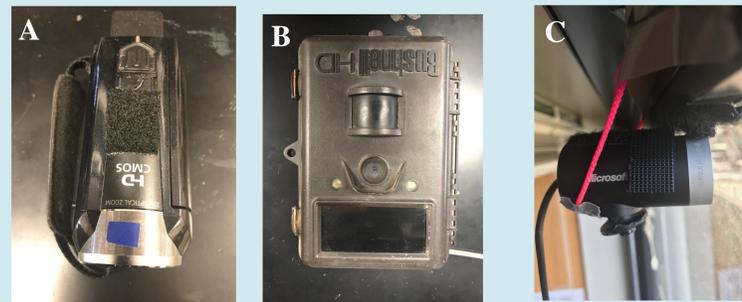


Fig 4. Various Cameras used for data collection: A-Camcorder, B-Bushnell Game Camera, C-PC Web-cam

Shocking station methods

- Shocking stations: metal plates with electrified eggs powered by an energizer.
- Game cameras were used to record crow activity in the least tern nesting enclosure.
- The computer program Picassa was used for cataloguing and analyzing all recovered data.

Baiting methods

- A feeding platform was created to deter squirrels and isolate the *Corvids*.
- Camcorders, and basic web-cameras were used to gather data and processed using iSpy video capturing software.
- Baseline data with real peanuts was collected prior to the introduction of replica bait in order to compare visitation.



Fig 5: Materials used for peanut construction and baiting: A-Alumilite 2-part epoxy, B-Finalized peanuts, C-Baiting platform

Replica bait methods

- An authentic peanut was made using a two part Alumilite casting epoxy with microballoons placed in a silicone mold.
- Precise color was created using a blend of acrylic paints: raw sienna, burnt umber, burnt sienna and smoked pearl.
- Paint then applied and heat dried for realistic texture.
- The replica bait was scented by being stored in sealed bags with crushed up peanuts.

Results

- An authentically visual, scented, and properly weighted peanut was synthesized to ensure baiting.
- Initially *Corvids* took the replica bait from the platform station with minimal if any hesitation.
- Additionally, there may have been less visitation by other crows promptly after a fake peanut was taken by a crow from the platform.



Fig 6. Crow taking a fake peanut from the platform station



Fig 6. Photo comparison of real peanut (R) to replica (L)

Discussion

- The successful baiting using replica food indicates that replica bait is effective at attracting crows.
- The testing will be continued to gather more data and to look for further patterns of deterrence.
- The potential deterrence induced by replica bait may be implemented during the Least Tern nesting season by saturating the site with replica eggs in addition to the active shocking sites.
- Additional electrical shock system testing will continue to be performed and assessed.
- Further sensory cues such as audible clicking from the shocking station are a future direction for this particular exploration.

Literature Cited

Velasco, Vanessa Nicole. "Investigation of Non-Lethal Electric Shock on American Crows as a Predator Aversion Treatment for Reducing Depredation on California Least Tern Eggs." Master's Thesis. Loyola Marymount University. 2015. Print.

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