What influences predation of duck nests near Humboldt Bay?

INTRODUCTION

Nest predation can greatly affect reproductive success and population growth of waterfowl. Why are some nests successful while others are eaten by predators? We used artificial nests to study the influence of the following factors on nest predation:

- Study area
- Vegetation type
- Nest concealment
- Distance from a trail

Humboldt Bay is an important nesting area for ducks such as Mallard and Cinnamon Teal. Results of this study can help local agencies manage habitat for the benefit of waterfowl.

Hen Mallard on nest.

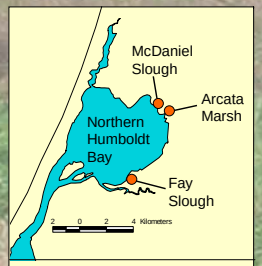

Figure 1. Three study areas in Northern Humboldt Bay.

METHODS

We placed 86 artificial nests each containing 6 brown chicken eggs in three study areas near Humboldt Bay: Arcata Marsh and Wildlife Sanctuary, McDaniel Slough, and Fay Slough (Figure 1).

Each nest was placed within 15 m of water in one of 3 vegetation types (cattail & willow, grassland, or thorny shrub). We estimated concealment by measuring the amount of vegetation covering the nest from above (vertical cover) and from four sides (lateral cover). Distance from each nest to the nearest trail was also recorded.

Nests were checked after 2-3 days, 7-8 days, and nests were removed after 21-22 days. We considered nests "unsuccessful" if any eggs were damaged or missing.

To identify predators, we placed a remote 24-hour video camera at two of the artificial nests in the study.

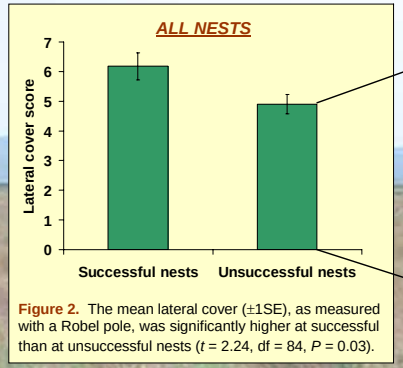

Figure 2. The mean lateral cover (±1SE), as measured with a Robel pole, was significantly higher at successful than at unsuccessful nests (t = 2.24, df = 84, P = 0.03).

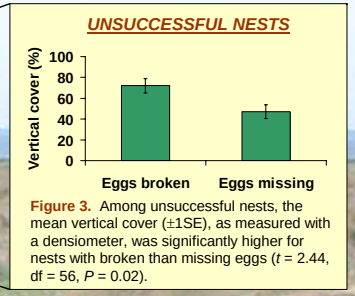

Figure 3. Among unsuccessful nests, the mean vertical cover (±1SE), as measured with a densiometer, was significantly higher for nests with broken than missing eggs (t = 2.44, df = 56, P = 0.02).

RESULTS

Fifty-nine of the 86 nests (69%) were unsuccessful. The nest predation rate was significantly higher at McDaniel Slough than at the Arcata Marsh or Fay Slough (Table 1). Successful nests had 12.8% more lateral cover than unsuccessful nests (Figure 2). For unsuccessful nests, vertical cover was 25% higher for nests in which eggs were broken than for nests in which eggs were missing (Figure 3). There was no significant difference in nest predation among the vegetation types. Nests far from trails were no more successful than those near trails (Table 1).

Table 1. Sample size and percent predation among study areas, vegetation types, and distance to trail categories. Only study areas were significantly different (χ^2 = 6.3, df = 2, P = 0.04).

	# nests	% predation
Study Area		
Arcata Marsh	37	59%
McDaniel Slough	29	86%
Fay Slough	30	60%
Vegetation Type		
Cattail & Willow	25	64%
Grassland	38	74%
Thorny Shrub	23	75%
Distance to Trail		
Near (<5 m)	54	61%
Far (≥5 m)	32	81%

Figure 4. Camera set-up and video stills of predators at nests.

Pair of Cinnamon Teal.

CONCLUSIONS

Cover around a nest appears to be more important in reducing nest predation than vegetation type or distance to a trail. Other studies suggest that lateral cover may be an important deterrent for mammalian predators, whereas vertical cover may be more important for protecting nests from avian predators.

We found lower vertical cover on nests with missing eggs than on nests with broken eggs. Therefore, we suspect that missing eggs were taken by avian predators, while broken eggs were eaten by mammals. This was supported by our video footage (Figure 4). Both vertical and lateral cover were lower at McDaniel Slough than the other sites, which could explain its higher predation rate.

Our artificial nest predation rate (69%) was similar to that found in studies of nesting ducks. However, factors affecting artificial nests may not reflect those of real duck nests, and our results should be interpreted with caution.

This study was conducted by the HSU Wildlife Techniques class, spring 2003. Poster committee (l to r): Heather Langendorf, Chris Bliss, Jenna Moore, Ryan Clark, Tia Adams, Scott Long, Alex Goodell, & Julie Bryant (not pictured). Special thanks to teaching assistant Rebecca Green and the rest of the class.

an HSU Wildlife publication