

Getting the house in order: Burrow establishment and incubation activity in a long-lived seabird Graham H. Sorenson, Robert A. Mauck; Biology Department, Kenyon College

Introduction

- Incubation is a particularly costly phase of reproduction in seabirds
- Leach's Storm Petrels are long-lived, pelagic, colonial birds that have high site and mate fidelity
 - Breeding pairs divide time spent in the underground burrow during the 40-44 day incubation period (Huntington et al. 1996)
 - Adult storm-petrels budget their time between activities at the burrow (digging out, sitting in, incubating egg once laid) and foraging trips (Ricklefs et al. 1986)
- Little is known about nest activity of burrowing seabirds prior to incubation period • Individuals make burrow choice decisions
 - Adults attend and prepare the nest prior to egg laying
- Data from Cory's Shearwater suggest that burrow activity is higher prior to egg laying than during incubation (Granadeiro et al. 1998)
- We studied a population of Leach's Storm Petrels at the Bowdoin Scientific Station on Kent Island, New Brunswick, Canada (Figure 1)
- Timing of arrival at the nest and subsequent activity level were investigated
 - When do birds first start attending their burrow?
 - How does burrow activity level change over the breeding period?
 - Does activity level vary between burrows with or without a mating pair?

Methods

- We monitored 215 burrows within the Shire study site, including both occupied (n=75) and unoccupied (n=140) burrows
- We placed a lattice made of fern stalks in front of the burrow entrances each day to monitor activity
 - A destroyed lattice was recorded as an active burrow for the previous night
 - An undisturbed lattice was recorded as an inactive burrow
- All burrows in the study area were checked regularly for an egg or adults
- Lay date was recorded to within a day
- We monitored burrows for a period of 40 days that included the lay date of all of the occupied burrows
- Burrows were categorized by egg status
 - All Burrows, Never Has Egg, Has Egg Currently, Will Eventually Have Egg, and Has Egg Anytime During Study
- We examined activity level as a function of egg status
- We analyzed activity level relative to the lay date for individual birds
- We created statistical models to determine timing of onset of activity at burrows that receive an egg and to test effect of egg presence on activity level
- GIS programs were used for spatial analysis of these patterns
- Map depicts the level of activity throughout site in topographic form • Burrows distinguished by presence of egg











Figure 5: Activity level was highest in periods prior 2-3 weeks prior to the lay date.





Figure 4: Burrows that will have an egg are more active before the egg is laid.



Figure 6: Models predicting arrival 19 or 20 days prior to lay date best fit the data.



- throughout the summer (Figure 2)
- those burrows is highest prior to the lay date (Figure 4) explains variation in burrow activity

StM2<-glmer(Act~1 + Bur3Stat + (1|Jdate) + (1|Burrow), data=AllBurStat, family=binomial)

- in activity of burrows (Figure 6)

AM20<-glmer(Act~1 + Ph20 + (1|Jdate) + (1|Burrow), data=AttTime, family=binomial)

• Burrows without eggs are found in clustered areas of lower success (Figure 7)

- Burrows with eggs more active than those without
- Breeding pairs most active in period prior to laying
- date of arrival was previously unknown

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Results

• Eventual presence of an egg was a strong predictor of activity in burrows

• Burrows with eggs are more active than those without (Figure 2,3) and activity in

• Grouping burrows by Never Have Egg, Pre-Egg, and with Egg Now best

• Activity in burrows with eggs is highest 2-3 weeks prior to lay date (Figure 5)

• Models predicting burrow arrival 19 or 20 days prior to egg best explain variation

Conclusions

• All burrows are attended or investigated during nesting period • Possible pre-breeder activity in those burrows without eggs

• Breeding pairs more active than pre-breeders • Birds may not investigate burrows other than own

Storm-petrels appear to first arrive 19-20 days prior to the date of egg laying;

Acknowledgments

References