

# Rodent Control Implemented to Help Save Tropicbirds on Statia

By Eline Eggermont (University of Utrecht) and Hannah Madden (CNSI)

**Black rats (*Rattus rattus*) probably arrived on St. Eustatius along with the first Europeans. While a nuisance for the human population, their negative impacts are felt far more by the island's fragile ecosystems, and are a significant threat to its biodiversity. In response, a rodent control project, funded by the Ministry of Agriculture, Nature and Food Quality, was launched in 2017. This project was implemented by the Caribbean Netherlands Science Institute (CNSI) and was previously presented in this magazine in 2017 (BioNews 6). This follow-up article will discuss the results of the ecological part of the project which focused on the red-billed tropicbird (*Phaethon aethereus*) nesting site on Pilot Hill, on the north-western coast of the island. Here, the decision was made to implement a rodent control project based on previous tropicbird monitoring programs that have been conducted since 2012.**

## Red-Billed Tropicbird

As the only species of seabird nesting on St. Eustatius, the red-billed tropicbird is an iconic species for the island. A pelagic seabird, it spends most of its life out on the open sea and as a result, little is known of their behaviour when they are away from land. Their breeding biology and behaviour is more easily - and thus more extensively - studied as they return to shore to nest within the

steep, rocky cliffs and slopes of Pilot Hill. Tropicbirds do not spend their time building nests. Instead, a pair will find a suitable cavity in which to lay their egg on the bare ground and shelter their offspring once it hatches. On average, the parents will spend six weeks protecting the egg, as they take turns incubating and hunting for flying fish and squid in the open sea. One parent usually remains in the nest constantly during incubation and during the first couple weeks of chick rearing. It takes roughly twelve weeks for a newly hatched chick to grow into a well-fed fledgling, although shortly before gaining their independence, fledgling chicks lose some of their weight as the parents stop feeding them.

## Population Concerns

Like many other seabird species, the global red-billed tropicbird population is in decline. According to the latest IUCN assessment in 2018, there are between 3,300 and 13,000 mature individuals globally, with an estimated total population not exceeding 20,000 birds. Invasive rodents such as rats and mice are cited as one of the biggest threats to seabird populations on oceanic islands. Tropicbirds are especially vulnerable as their nest sites are easily accessible by rodents, they have a long incubation period, and chicks inside the nest are unable to escape from predators. On St. Eustatius, camera traps have documented egg

predation by rats inside nesting cavities. Over half of the nesting attempts fail each season, which is significant considering tropicbird females lay a single egg per clutch. The cause of most of these nest failures could not be determined, but rats are thought to be a factor.

## Local Monitoring Programs

Monitoring of red-billed tropicbirds was started by Hannah Madden (STENAPA, CNSI) in 2012, and assisted by Kevin Verdel (Utrecht University), Max Oosterbroek (Van Hall Larenstein), and Eline Eggermont (Utrecht University) during the course of the rodent control project (2017-2019). Tropicbirds nest at several locations around the island, but the site on Pilot Hill is monitored because it is relatively accessible and thought to be the largest nesting area on St. Eustatius.

For the 2017-2018 season, a grid of bait stations was established across the entire study area. For the 2018-2019 nesting season, half of the study area was treated with brodifacoum rodenticide, whereas the other was left untreated. Brodifacoum is a second-generation anti-coagulant that kills rats and other rodents within 5 days of ingestion. Bell Laboratories, Inc., which has supported a number of invasive species management projects on other islands, generously donated FINAL™ blox and AMBUSH bait stations for the project.



Red-Billed Tropicbird, photo by: © Albert Beintema

### Preliminary Results

The relative abundance of rodents at the nest site was assessed via tracking pads, which were set out at 25m intervals every month in a predetermined grid. Tracking pads (pictured below) are rectangular pieces of cardboard with an ink section, baited with peanut butter to attract rodents and capture their prints. Using these methods, the relative abundance of rodents was found to have decreased significantly from 86.7% before treatment, to <2.0% post-treatment. Apart from rat and mouse prints, we also tracked small lizards, crabs, and insects.

Using the nest survival model in the program MARK, the survival rates of nests from the best-fitting model was 33.6% in the 2017-2018 season and 35.7% in 2018-2019. Nest age was the most important explanatory variable for survival in the incubation and chick rearing stage, and overall, suggested that nests and chicks were more likely to survive as nest age increased. For every one day increase in nest age, the odds of an egg surviving increased by 5.9%. For every one day increase in nest age, the odds of a chick and nest surviving increased by 4.6% and 4.3% respectively. The figure below represents the increase in daily survival rate percentage as nest age increases. Our results are consistent with various studies that have demonstrated an increase in nest survival rates as nest age increases.

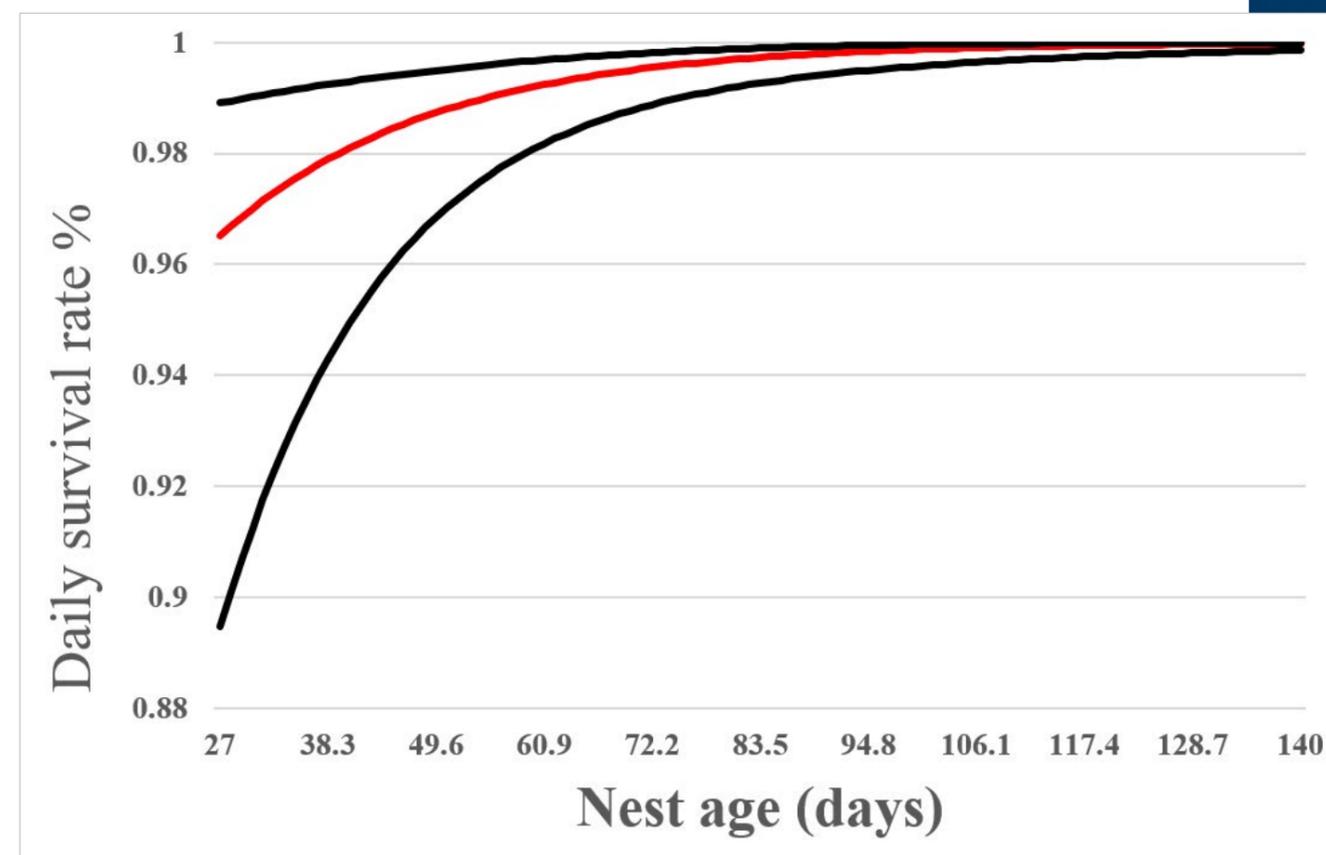
### Rodent Control Alone is Not Enough to Save Tropicbirds

Much has been written about the detrimental impacts of rodents on seabird populations. Contrary to expectations, however, rodenticide treatment over the study period did not result in an increase in nest survival rate compared with

previous years. This could be because adult tropicbirds may be large and aggressive enough to fend off invasive rodents. Furthermore, a number of factors may have limited the success of the project. These include the limited number of accessible nests, the absence of a 'control' nest site for comparison, and crab interference with bait stations. Thus, despite successful rodent control, nesting success still declined compared with previous years. Although this might seem alarming, natural fluctuations in nest survival rates are common among seabirds.

Tropicbird survival is likely affected by other, undetermined factors. Possible external factors include pollution, foraging areas, prey availability, oceanographic conditions, and/or extreme weather. It should be noted that our study commenced following two category five hurricanes, which impacted the island in September 2017. Nevertheless, this is the first study of its kind focusing on rodent control and red-billed tropicbird survival, and we hope that our results will be useful for conservation efforts on other islands.

This February, one tropicbird chick regurgitated  $\pm 10$  cm of plastic tape, after it was fed by its parents. Plastic ingestion is a growing problem among many oceanic bird species and requires further research as little is known about the exact scale of this problem and its long-term health effects. Finally, we suggest that red-billed tropicbird monitoring continue, as more information will aid in the conservation and survival of the species. All the information collected between 2012 and now will form an essential tool to help us determine the most effective conservation strategies to safeguard this majestic seabird on St. Eustatius.



Above: Daily survival rates of Red-billed Tropicbird chicks in 2018-2019

Rodent Control Implemented to Help Save Tropicbirds on Statia

Would you like to share a news item?  
Please e-mail us: [research@DCNAnature.org](mailto:research@DCNAnature.org)