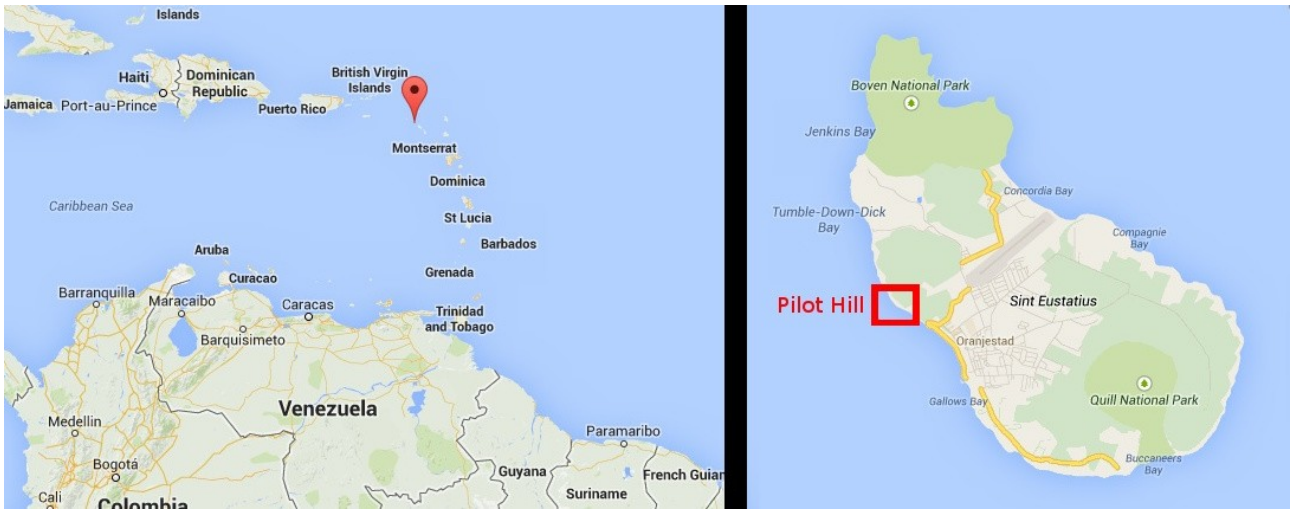
Measuring the Breeding Success of Red-billed Tropicbirds (*Phaethon aethereus*) on St Eustatius, Dutch Caribbean by T. Foxley

Background and Methods

Rats are widespread invasive species and have been reported to be a big problem for seabirds in many parts of the world. Many seabird species are adapted to breeding on isolated islands that – until relatively recently – were free from predators. A slow breeding rate and lack of defensive adaptations means that many seabird populations have crashed under pressure from invasive species.

In the 2011-12 breeding season a 0% breeding success rate was reported for red-billed tropicbirds on Saba, a small island in the Dutch Carribean, apx. 26km north east of St Eustatius. Following this report a pilot study was set up on St Eustatius in the 2012-13 breeding season, monitoring five tropicbird breeding sites. Results from this study suggested that breeding success could be as low as 33% at some sites. One site – Pilot Hill, the largest and most accessible of the five sites (figure 1) – was selected for more intense monitoring.

Figure 1 – Map showing the location of St Eustatius in the Caribbean and the location of Pilot Hill on St Eustatius (modified from Google)



Nests were monitored weekly – this involved visiting previous nest cavities, if birds were found (photo 1) these were extracted and biometrics (mass, bill length, bill depth, head-bill length) taken (photo 2) and birds were ringed. Biometrics for adults were only taken for new individuals as once mature bill measurements do not change. Chick biometrics were taken weekly.

Ten camera traps were deployed in nests to try to identify the causes of breeding failure, these generally focussed on nests with eggs and new chicks (up to two weeks old).

Photo 1 – Adult and juvenile red-billed tropicbirds in the nest (T. Foxley)

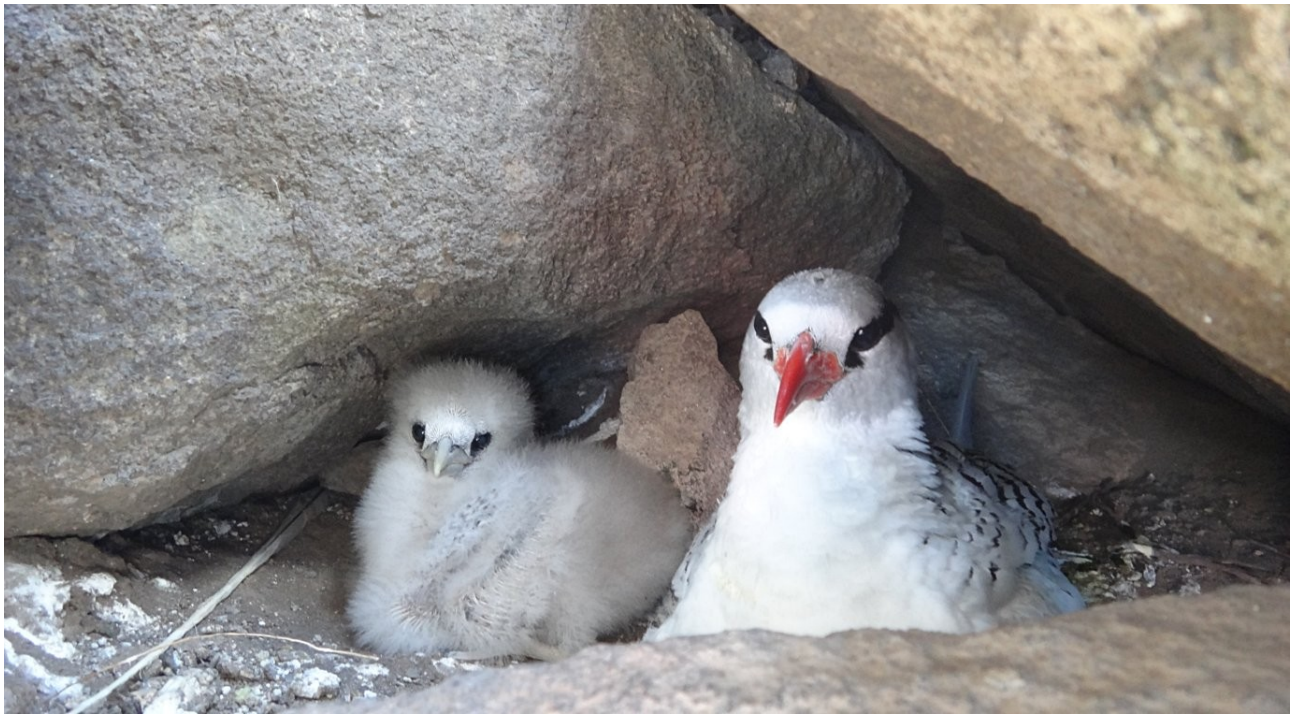
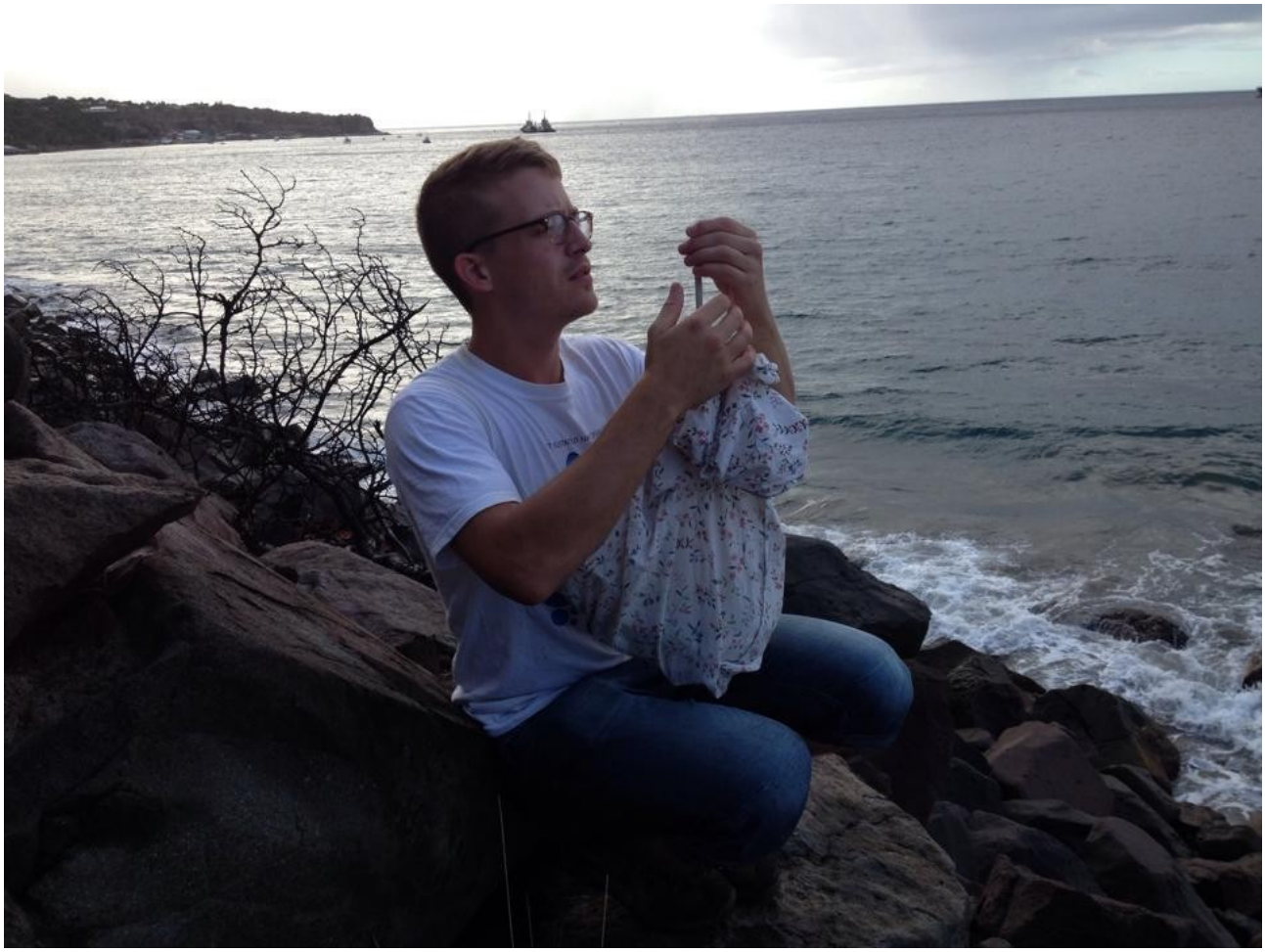


Photo 2 – Taking mass measurements (S. de Leeuw)



Results

Of nests monitored from 14th October 2013 to 8th April 2014 60% hatched successfully. Of those that hatched successfully there was 65% fledging success. Overall breeding success was 45% (table 1).

Table 1 – Breeding success of red-billed tropicbirds on St Eustatius from 14/10/13 to 08/04/14

Summary	Total	Definition
AON	88	total number of apparently occupied nests
Nests sites with laying success	61	total nest cavities in which at least 1 egg was laid
Eggs	78	total number of eggs laid
hatched	43	total hatched eggs + nests found with chicks already hatched
not hatched yet	6	eggs still in nest
lost	29	eggs disappeared before hatching or failed to hatch
lost by predation	7	eggs taken by predators
lost otherwise	18	eggs not hatched, abandoned, damaged
% Apparent Hatching Success	**59.72%**	% of eggs that hatched (excludes ongoing)
% Egg loss	40.28%	% of eggs lost (excludes ongoing)
% Confirmed egg predation	9.72%	% of eggs lost to predators (excludes ongoing)
% Egg loss unknown cause	25.00%	% of eggs lost for unknown reasons (excludes ongoing)
Chicks	43	total chicks
fledged	17	total chicks probably fledged
not fledged yet	17	chicks still in nest
lost	9	chicks disappeared before fledging
lost by predation	0	chicks lost to predators
lost otherwise	9	chicks died or disappeared before fledging
% Apparent Fledging Success	**65.38%**	% of hatched that fledged (excludes ongoing)
% Chick loss	34.62%	% of chicks lost (excludes ongoing)
% Confirmed chick predation	0.00%	% of total chicks predated (excludes ongoing)
% Chick loss unknown cause	34.62%	% of chicks disappeared for unknown reasons (excludes ongoing
% Apparent Breeding Success	**44.74%**	% of eggs that fledged (excludes ongoing)
% Apparent Reproductive Success	35.42%	% fledged chicks per AON/pair (excludes ongoing)

Rats and other tropicbirds were the only cause of egg loss identified by camera-trapping. Many photos were also taken of land crabs, while these were not seen taking any eggs they visited nests frequently and were photographed scavenging eggs taken by rats.

Six incidents of rats taking eggs were recorded on camera (e.g. photo 3) and there were two incidents of eggs being destroyed (presumably) by conspecifics (e.g. photo 4). It wasn't possible to identify individuals from photos so it's impossible to say eggs weren't destroyed by the parents, however it appeared likely that this was caused by other adults.

Photos show that rats take eggs opportunistically – they do not force birds from eggs and only predated upon eggs that had been left unattended by adults. Adults often left eggs unattended, the reason for this is unknown – perhaps due to inexperience or the need to feed.

Photos 3 – Camera-trap photo of rat eating tropicbird egg (T. Foxley/STENAPA)

Photo 4 – Camera-trap photo of adult destroying egg (T. Foxley/STENAPA)

Future Work

This first year of intensive monitoring at Pilot Hill has laid important foundations for the long-term monitoring of breeding tropicbirds on St Eustatius. The monitoring programme will continue and the results found will contribute to informing conservation strategies for seabirds in the Dutch Caribbean.

Grant Expenditure

All money was spent on living costs. Living costs were high as most food on St Eustatius is imported. Remaining costs were partially covered by other grants, the rest was taken as personal cost.

Acknowledgements

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