

Hihi (Stitchbird) Breeding on Tiritiri Matangi Island

2016 – 2017 Breeding Season

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Note: There is a data embargo in place so please contact John Ewen prior to using data reported.

1. Summary

1.1 Key results for the current year

This season has seen an increase in the numbers of hihi on Tiritiri Matangi with the pre-breeding census numbers higher than the previous two years. Productivity was also higher than the previous season, an additional 10 females were observed to be breeding. Hatching success has also increased; most likely due to a lower number of females laying second clutches, this in turn increased the fledging success to 53%.

141 and 204 individuals were recorded in the September 2016 and February 2017 censuses respectively. The first egg was laid on 23rd September 2016 and the last chick fledged on 11th February 2017.

Table 1 Number of females breeding in the population on Tiritiri Matangi

	First year females	Older females
Seen in September survey	26	22
Breeding this season	30	32
Fledglings produced	53	98

1.2 PIT-tagging

The decision was made at the beginning of the season to remove all PIT tags, unfortunately the welding method was not 100% successful on the tags and some slippages onto metal bands and feet once again occurred. This risk coupled with the evidence that some tags had broken and would no longer record the bird's presence has shown that the technology is not yet at the stage to provide richer and more accurate population data. Huge effort has been made to remove all PIT tags and only 13 birds sighted in the February survey were still wearing tags. Work is ongoing to provide an alternative tagging method for the future.

2. Introduction

2.1 Background

The hihi, or stitchbird (*Notiomystis cincta*), is an endemic forest-dwelling passerine that was once found throughout the north island. The species declined rapidly in the late 1800s due to a loss of habitat, introduced predators, and possibly disease. The only remaining naturally occurring population is on Hauturu-o-Toi, Little Barrier Island. In addition, there are five translocated populations maintained on Tiritiri Matangi Island, Kapiti Island, Zealandia (Karori) in Wellington, Maungatautari near Hamilton, and Bushy Park near Whanganui.

Hihi are sexually dimorphic, territorial cavity nesters with a mating system characterized by extra-pair and forced copulations. They breed between September and March, averaging two clutches of 4-5 eggs each. Hihi forage for nectar, fruit and insects and translocated populations rely heavily on provisioned sugar water in times of scarcity.

2.2 Site description

Tiritiri Matangi is a 220 hectare island roughly 3 kilometres long and one kilometre wide. It is located in the Hauraki Gulf, 28 kilometres north of downtown Auckland. Extensively farmed in the 1900's, Tiri has been replanted with over 280,000 trees since 1984 in an attempt to recreate the original northern broadleaf coastal forest.

The remnant mature forest on Tiritiri Matangi is dominated by kohekohe, taraire and pohutakawa. Other species on the island include: taupata, karamu, hangehange, mahoe, mapou, whau, ngaio, puriri, totara, rewarewa, hoheria, hinau, pigeonwood, kowhai, karo, akeake, manuka, kanuka, kawakawa, five finger, houpara, wharangi, rangiora, cottonwood, mingimingi, taurepo, native broom, koromiko, kumarahou, astelia, flax, muehlenbeckia, native jasmine, supplejack, and tree ferns.

Tiritiri Matangi is free from introduced predators, although there are many pairs of morepork (*Ninox novaeseelandiae*) and they are known to eat hihi. Two species of honeyeater, tui (*Prosthemadera novaeseelandiae*) and bellbird (*Anthornis melanura*), occur naturally on Tiri and compete with the hihi for food. Aggressive bellbirds regularly displace hihi at the sugar feeders. Tui, however, are excluded from the feeder cages by virtue of their larger size.

2.3 Personnel

The 2016-17 breeding season on Tiritiri Island was managed and monitored by Mhairi McCready.

Volunteers this season were: Anne Boergers & Christine Friis. Volunteer help is always useful and appreciated, both volunteers were competent in the tasks set for them. Anne volunteered for a total of 35 days through November-January which was particularly helpful as she had time to learn and improve; she also hopefully found it more rewarding. It is perhaps something to consider for upcoming seasons as the consistency of one person is useful. These volunteers were organised through Michelle Jenkinson at DOC.

Three PhD students have been collecting data on the island during this season; Alex Knight sampled 89 hihi for parasites during October. Victoria Franks returned for a third and final time, she arrived in January and will be observing juvenile behaviour until May. Caitlin Andrews also arrived in January and is collecting data on individual foraging preferences of the hihi.

3. Methods

3.1 Surveys

A pre-breeding survey and a post-breeding survey were conducted at the end of September 2016 and beginning of February 2017. Each of these involved approximately 40 person-hours spent recording band combinations of birds found throughout bush patches and at sugar feeders.

3.2 Distribution and placement of nest boxes

All major bush patches on the island contain hihi nesting boxes. Two new boxes were installed this season, to provide a second box in territories that only had one and were being used by females. There are 192 boxes currently spread across the island, which is adequate for the population size as it stands.

3.3 Nest site monitoring

Completed nests were checked almost daily until eggs were laid. When eggs were found to be warm or the female observed sitting for more than 10 minutes on 2 consecutive days incubation was confirmed. These nests were not checked again until day 13 of incubation, after which they were checked every day to check for hatching and until the chicks were 10 days old. After day 10 the nests were checked every-other day until day 21 when the chicks were banded. After banding the nests were not checked again until day 29 and everyday thereafter to determine fledging dates.

3.4 Nest box maintenance

Twenty-five nest boxes were replaced with new as they had been out in the bush and used for breeding attempts for five years. All other nest boxes were cleaned at the beginning of the season. During the season all boxes that had been used for a breeding attempt were brought back to base and scrubbed with water, sprayed with trigene and left to dry in the sun for 24 hours before being returned. The backboards were scrubbed and sprayed with trigene at the time of box removal so they could dry before the box was returned.

3.5 Supplementary feeding regime

Sugar water was provided *ad libitum* in chicken-feeder-style plastic feeders placed in feeding stations at 6 locations on the island. Feeders were cleaned in hot soapy water, rinsed, and then sprayed with trigene, allowing a minimum of 5 minutes contact time. These were then rinsed and left to dry. Feeding stations were cleaned and disinfected with trigene on Mondays, Wednesdays and Fridays. All feeder cages were brought back to base for a thorough deep clean once during the season, the wood was permeated with sugar residue and poo and it would be advisable for a deep clean to be on a more regular basis.

3.6 Banding and measurements

Nestlings were banded, weighed, measured and had blood drawn at 21 days old, on a few occasions the chicks were not large enough to band or sample but were still measured for consistency and banded & sampled at a later date. Tarsus measurements were "to the notch" and "full length"; "head- to-bill" was measured from back of the head to the tip of the beak. Each nestling was given a c-size metal band and a combination of 3 plastic colour bands. All plastic bands were sealed using the new welding method. For a list of band combinations and measurements please contact John Ewen (john.ewen@ioz.ac.uk).

3.7 Health

Mite control was carried out this year. Nestlings with mites were treated with frontline; no nests were infested to the point of needing a replacement. Four female hihi were found dead this season, 2 were very decomposed and 2 were sent for necropsy, reports are found in the appendix.

4. Results

Visitor numbers to Tiritiri Matangi have been estimated using the number of passengers travelling on the ferry, this was 30,665 for 2016. All of these visitors will have had the opportunity to see a hihi on the island.

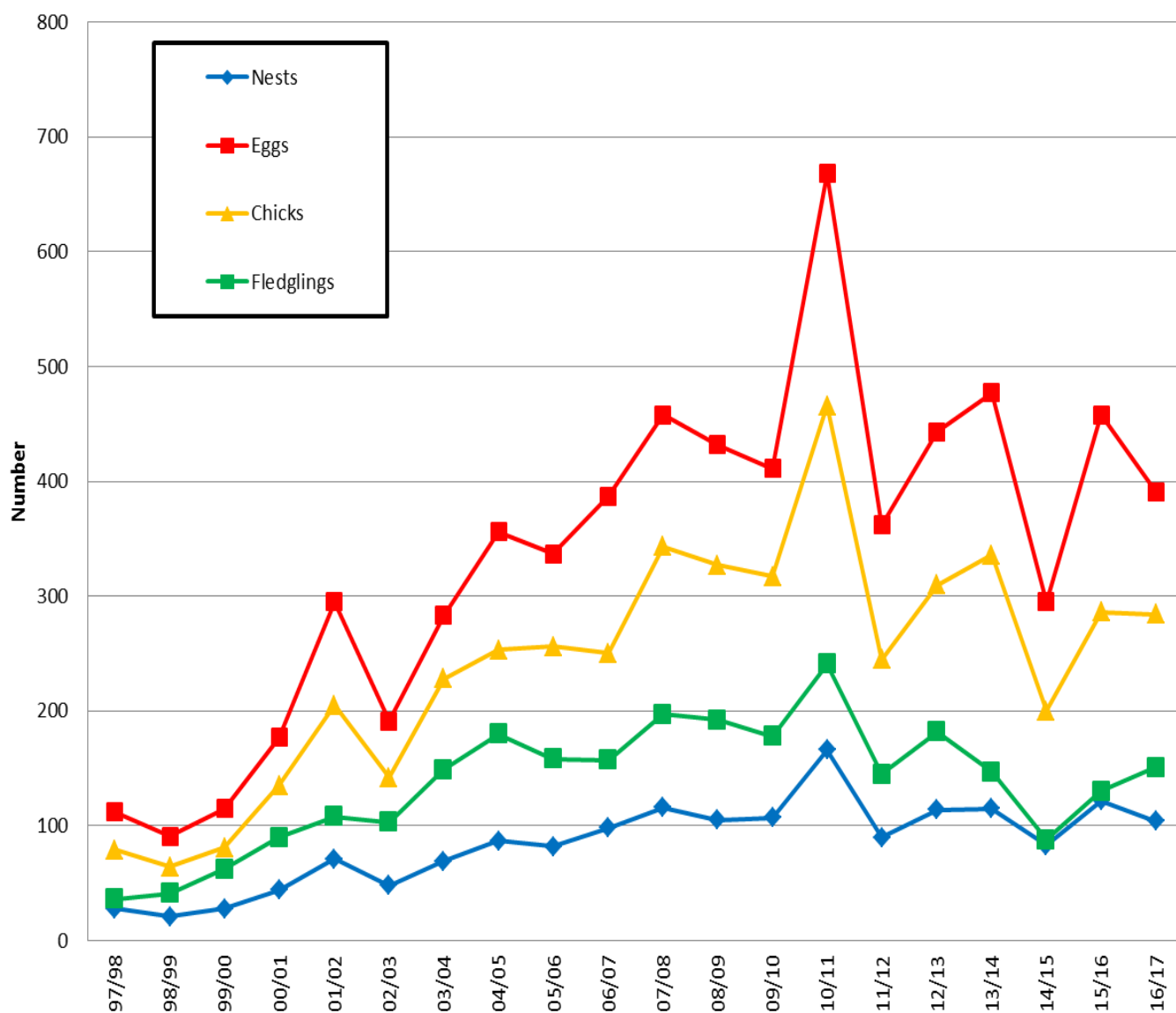


Figure 1 Number of nests, eggs, chicks and fledglings produced on Tiritiri Matangi from 1997 to 2016

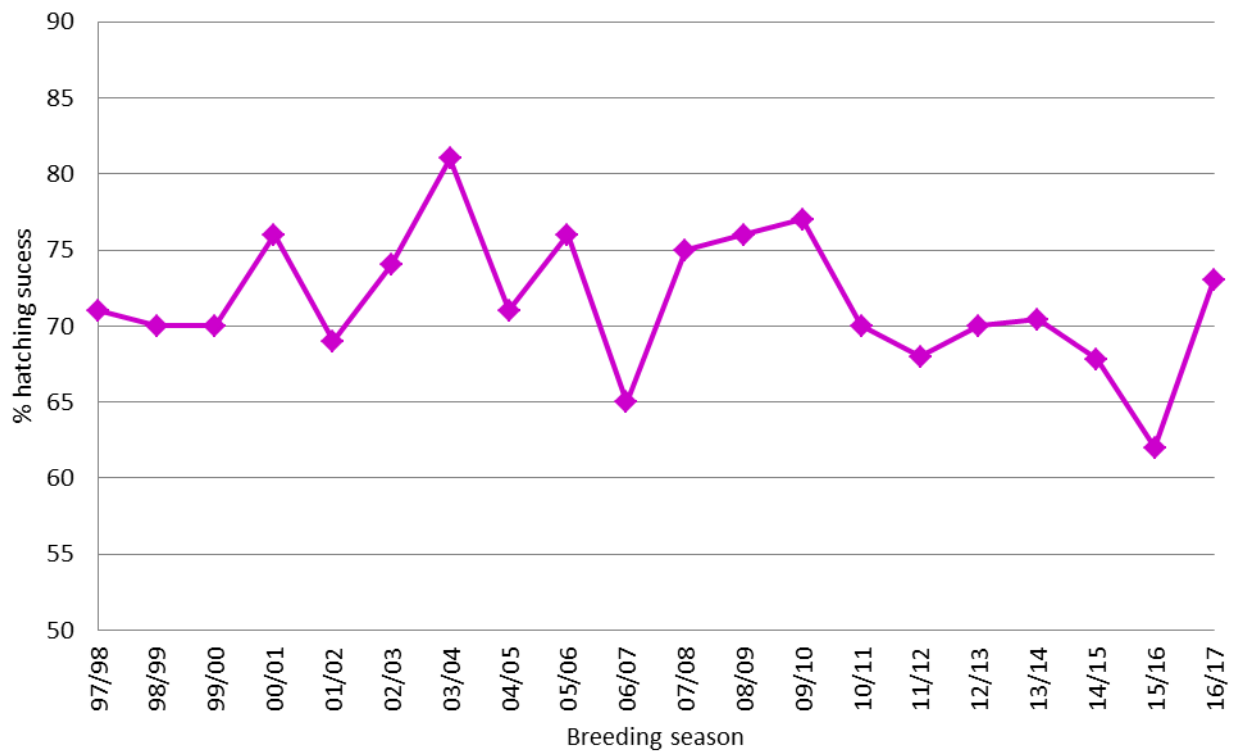


Figure 2 Hatching success on Tiritiri Matangi from 1997 to 2016

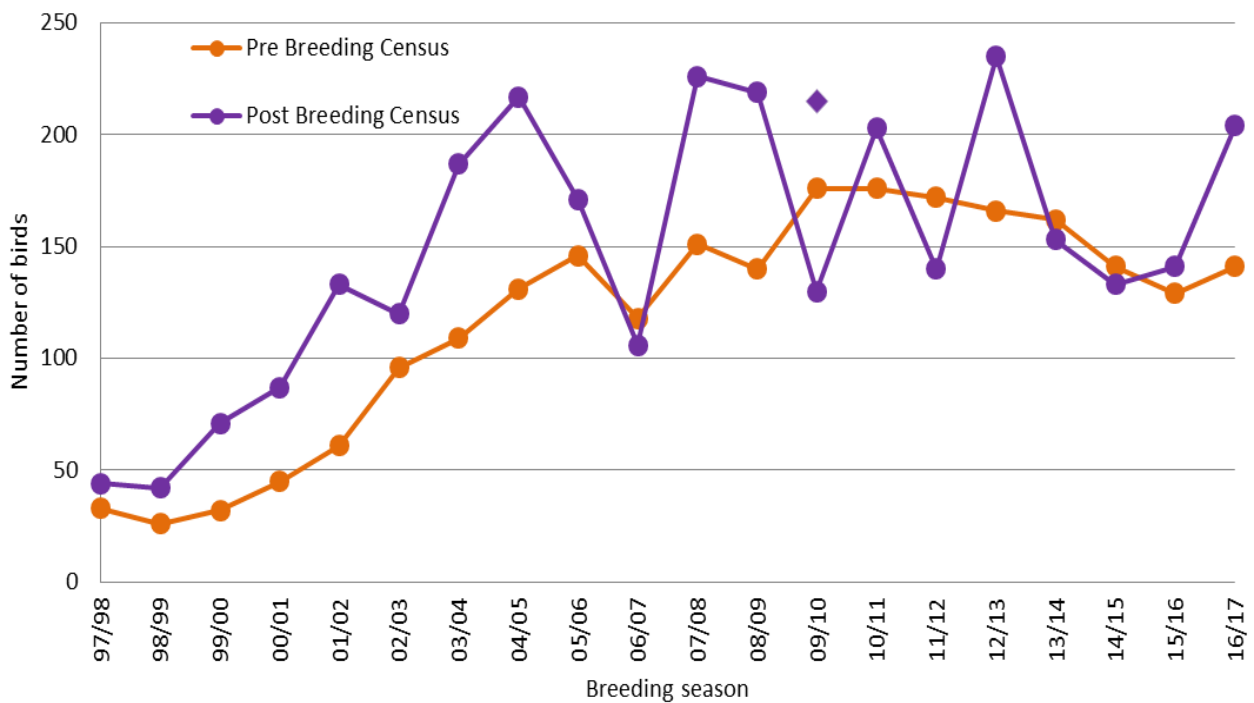


Figure 3 Number of birds recorded each year on Tiritiri Matangi during the two annual surveys from 1997 to 2017. Note that the survey of 09/10 took place immediately after juveniles were translocated; the single diamond shows the survey result including those removed.

5. Colour band loss

The loss of one or more colour bands from an individual hihi results in an incomplete colour combination, this makes identification during population surveys and breeding monitoring ambiguous. Although the results from the new welding method were disappointing for the PIT tags, so far it has shown the best results for band closure achieved for butt bands on hihi. During the September 2016 survey only 3% of birds were noted as missing one or more colour bands. All bands have been welded this season in the hope that similar results can be achieved. The type of plastic the bands are made from has an effect on the ease of melting, the acetal bands are easiest to melt and form the best join.

6. Acknowledgments

The Department of Conservation and the Supporters of Tiritiri Matangi (SoTM) are critical components of this project. Many thanks to Dave, Matt, Kata & Vonny the supportive Tiri ranger team. So many SoTM members were helpful, enthusiastic and interested as always and we appreciate their commitment to the hihi and this island project. Hihi conservation also benefits hugely from the hihi sponsors, NZ Safety Ltd.

Appendix (Pathology Reports)

Institute of Veterinary, Animal and Biomedical Sciences

PATHOLOGY REPORT

Submitter's Ref.: C-94422	Date Sent: 29/11/2016	Accession No.: 54052
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TO: Mhairi McCready
Department of Conservation- Tiritiri Matangi
Auckland

Species: Avian-WL (1)	Sex: Female	Age: 2013/	Breed: Hihi (Stitchbird)
ID: C-94422 Blue @ W/R (L)	At Risk: 140	Affected: 1	Dead: 1
Owner: Department of Conservation	Prev. Accn.:	Type: Post Mortem	

HISTORY

Found in nets box, had been sounding croaky 2 weeks previously

GROSS FINDINGS

26g. Good body condition, minimal fat reserves in neck or abdomen. There was a mature but inactive ovary and oviduct. The gut was empty.

There was a 3-4 mm caseous white abscess on the caudal left lung which was adherent to the left body wall. On removal this extended into the parenchyma of the lung. Both lungs were reddened and consolidated.

On trimming a white abscess was found in the left atrium of the heart

HISTOPATHOLOGY

Lung: there is patchy congestion and parabronchi often contain variable amounts of proteinaceous fluid and small numbers of macrophages.

Heart: the left atrium is partially occluded by a mass of fibrin, proteinaceous fluid, erythrocytes admixed with large numbers of fungal elements and scattered aggregates of heterophils.

Liver: the majority of hepatocytes contain small to moderate amounts of intracytoplasmic pigment resembling iron in the form of haemosiderin; there is also mild to moderate hepatocellular anisokaryosis and binucleated cells are frequent.

Kidney: small numbers of proximal tubular epithelial cells contain small amounts of intracytoplasmic pigment resembling iron in the form of haemosiderin.

Intestine: several sections contain small numbers of cestodes and trematodes within their lumina.

Sections of gizzard, ovary, oviduct and brain show no obvious abnormalities.

DIAGNOSIS

Mycotic (fungal) pneumonia and myocarditis

COMMENTS

This bird had a fungal infection of the heart and lungs; given the species of bird, the species of fungus responsible is most likely *Aspergillus*. The bird was in fairly good body condition, with good pectoral muscle mass.

Institute of Veterinary, Animal and Biomedical Sciences

PATHOLOGY REPORT

Submitter's Ref.:	Date Sent: 10/01/2017	Accession No.: 54133
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TO: Mhari McCreedy
Department of Conservation
Tiritiri Matangi
Auckland

Species: Avian-WL (1)	Sex: Female	Age: ~1 Year	Breed: Hihi (Stitchbird)
ID: CP-8239	At Risk:	Affected: 1	Dead: 1
Owner: Department of Conservation	Prev. Accn.:	Type: Post Mortem	

HISTORY

Found dead on floor (09/01/2017), had been breeding this season and leaves behind one chick close to fledgling age.

GROSS FINDINGS

An accurate body weight could not be determined because of the presence of large numbers of maggots and autolysis, but the bird was in poor body condition, with reduced pectoral muscle mass. The internal organs were in an advanced state of autolysis but multiple, light yellow, reasonably discrete firm nodules up to 2mm were visible in the right lung lobe.

DIAGNOSIS

Mycotic pneumonia
Emaciation

COMMENTS

The hihi was in reduced body condition and there were multiple small yellowish nodules in the lung which are most consistent with a fungal pneumonia. The internal organs were too decomposed for histological evaluation.

File Nos.:

Students: Soon, Xue Qi

Date:

Pathologist: S A Hunter

Copy to: