VETERINARY MANAGEMENT OF A CRITICALLY ENDANGERED SEABIRD

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INTRODUCTION

Background information of the Chatham Island Taiko (*Pterodroma magentae*)

The Chatham Island Taiko is considered the rarest seabird in the world. This species is endemic to the Chatham Islands and classified by the New Zealand's Government's Department of Conservation (DOC) as category A, nationally critical, which means it has the highest priority for conservation management. Taiko are also ranked as Critically Endangered by the International Union for Conservation of Nature IUCN Red List Categories (IUCN 2011). Currently there are 17 known breeding pairs, with an estimated population of 120 to 150 birds (Gummer, 2011).

The Chatham Island Taiko is a medium size gadfly petrel, weighing between 500 and 600 grams, with a wingspan of around one meter. It spends most of its life at sea, feeding in the South Pacific Ocean between the Chatham Islands (Chathams) and South America, returning to the Chathams only to breed. The Taiko once bred in large numbers on Chatham Island and was an important part of the diet of the Moriori, the indigenous people of the Chathams. After discovery of the Islands by Europeans in 1791, who brought cattle, pigs, sheep, cats, dogs and rats, Taiko numbers soon decreased significantly. The species was considered extinct for almost a century until David Crocket rediscovered it in 1978. Without the maintenance of predator free sites, the Taiko would rapidly become extinct. Continuing protection of the remaining adults and chicks is needed to prevent the extinction of this species (Chatham Island Taiko Trust website; Heather and Robertson, 2005).

Breeding cycle of the Chatham Island Taiko

Male birds first return to the Chathams at an age of five years, while females may not return until six to nine years of age (IUCN 2011). The birds arrive at the Chathams during the second half of September to prepare their underground burrows, which can be up to 5 metres long. They mate during the first half of October, after which the birds disappear for a pre-laying exodus of 40 to 55 days for females and 25 to 45 days for males. This pre-laying exodus to accumulate the food reserves needed for egg formation and to endure fasting spells during incubation is thought to be an essential phase of the breeding biology of Procellariiformes, and has been studied in other seabird species (Mallory et al., 2009). During the second half of November a single egg is laid. The egg hatches in January after 55 days of incubation. The chick fledges at around 105 days of age in May or early June. It emerges from its burrow for six to 10 nights before it climbs a tree and launches itself towards the sea, where it will stay for at least five years before returning to the Chathams to breed (Heather and Robertson, 2005). Taiko can live for over 30 years, form life long bonds and return annually to the same burrow in the dense forest of the Tuku Nature Reserve in the south-west of Chatham Island

(Chatham Island Taiko Trust website). Some single males seem to have trouble attracting females to their burrows (Miller et al., 2008).

Conservation efforts

Intensive predator control by DOC focuses on controlling feral cats, possums and Weka across large areas in the Tuku breeding grounds, and trapping rats around each individual burrow. The breeding area has also been protected from human disturbance by the establishment of the Tuku Nature Reserve. All burrows are actively monitored with the use of infra-red cameras, and health checks are performed on all Taiko chicks regularly.

The Chatham Island Taiko Trust (CITT) was created in 1998, with the primary aim to create a predator free site close to the original Tuku breeding grounds and thus provide long term protection for breeding birds. In 2006 a predator proof fence was completed around the Sweetwater Nature Reserve, and in 2007 this site was declared predator free. A sound system was established within the Sweetwater reserve to attract adult Taiko and since 2007 all known 58 Taiko chicks that have hatched have been transferred from their Tuku burrows to artificial burrows at the Sweetwater site over the last five breeding seasons. Chicks are transferred within the last four weeks before fledging. The aim is to allow the parents to feed the chicks as long as possible, but transfer them before they first emerge from their burrows, so they imprint on the Sweetwater site. The expected time of fledging and transferral date is determined by wing length. “Fledging” means to care for (or rear) a young bird until it is ready to fly, and “fledged” means it can fly. At the new site the chicks are fed every 48 hours with sardine fish slurry. Hopefully, in five years time, these chicks will return to the Sweetwater site to breed, and establish a new breeding colony on these predator free grounds (Gummer, 2011).

CASE REPORT

History

During the 2011 breeding season, a female Taiko chick was found wet and “bedraggled” outside its burrow after a rainy night. The chick had already been emerging for six nights, and was estimated to be close to 100 days old. A week later the chick still looked wet with untidy feathers, and needed more frequent feeding to maintain its bodyweight. Following consultation with the DOC veterinarian, the decision was made by DOC and the CITT to send the bird to mainland New Zealand for veterinary care. A Taiko had never been moved from Chatham Island previously and the main worry of people involved was that by interfering with the bird’s normal behaviour pattern its time-window for fledging would be missed. Because the bird’s chances of post fledging survival were severely diminished in its current state, the bird was flown to The Nest, an animal hospital and centre for native wildlife at Wellington Zoo, for veterinary care.

Clinical tests and initial treatment

On arrival at The Nest (day 1) the chick weighed 490 grams and was started on Itraconazole (Sporanox, Janssen-Cilag New Zealand LTD, 10 mg/ml oral solution) 5 mg/kg PO SID as a preventative for aspergillosis and 20 ml of 0.9% NaCL PO SID. The bird was placed in a dark cage with a hiding shelter in a temperature controlled room at 24^0C to recover from the journey. Later in the day the chick was mist-sprayed with 3% kitchen salt solution to promote preening behaviour (the bird ingests salt when preening to keep the salt glands active). The chick showed various patches on the wings and neck that were not fully waterproof, probably due to environmental contamination of the feathers,

through human handling, or lack of preening due to an underlying health issue.

On day 2 the chick was given a general anaesthetic with inhalational isoflurane in oxygen. Sodium chloride 0.9% was given IV at a rate of 15 ml/kg/hr via a 24 gauge IV-catheter placed in the medial metatarsal vein. Lateral and ventro-dorsal radiographs and a blood sample were taken. A thorough check of the feathers and a thorough physical examination were performed. A cloacal swab was taken for culture for *Salmonella* spp., *Yersinia spp.* and *Campylobacter* spp., and a faecal sample was collected for a faecal float for parasites. The bird's weight had dropped overnight to 460 grams. Post recovery the chick was tube fed with 75 ml of fish slurry (25% salmon, 75% sardine). Because a direct faecal smear on the island was reported to have shown one tapeworm egg, the bird was given a single treatment with pyrantel pamoate 18 mg/kg PO and praziquantel 4.5 mg/kg PO (1/8 Drontal all wormer for cats, Bayer New Zealand LTD).

Results

Radiographs showed no abnormalities. Blood biochemistry values were considered to be within normal limits (AST 148 U/L, BA <35 umol/L, CK 564 U/L, UA 153 umol/L, Glu 17.2 mmol/L, Ca^{2+} 2.44 mmol/L, Phos 2.33 mmol/L, TP 29 g/L, ALB 26 g/L, Glob 0 g/L, K^{+} 4.1 mmol/L, Na^{+}153 mmol/L, Hem 2+, Lip 1+). The PCV was 43, and the estimated white blood cell count was 9.3x10^9/L, with 21.2% heterophils, 1.9% monocytes, 76.9% lymphocytes. A high percentage of lymphocytes is a common finding in seabirds (Newman et al., 1997). The thrombocyte count was reported as adequate, and 5% polychromasia was noted. A mild sheen, which was possibly contamination of the feathers, was seen on the dorsal aspect of the wings and on a patch on the back of the head and neck, while the general condition of the feathers appeared good. Bacteriology for *Salmonella* spp., *Yersinia spp.* and *Campylobacter* spp. was negative. No worm eggs were found in the faecal sample either in a direct smear or after flotation. These results did not indicate an underlying disease process and the focus was shifted to recovering full waterproofing and maintaining the bird's ideal fledge weight of 450 to 500 grams.

Recovery period before release

Itraconazole and oral saline solution were continued at the same dose rate during the bird's stay. The bird was sprayed with 3% kitchen salt solution a few times a day and tube fed 80 ml of fish slurry (25% salmon, 75% sardines) every 48 hours. On days 3 and 4 the bird was bathed in a 2 metre diameter tub. Bathing times were restricted to a few minutes, because of the bird's frantic attempts to escape from the tub. From days 5 to 7 the bird slowly became used to bathing, working its way up from a shallow tray with lukewarm water to the initial 2 meter diameter tub. The bird was still not preening and feather quality had not improved, but maintained its weight on 48 hourly feeds. Because waterproofing had not improved, and contamination of the feathers was becoming more likely, the bird was given a wash on day 8 according to the oiled wildlife response protocol, which included four washes in warm water with Sunlight soap solution, followed by a thorough rinse with warm water. The burd regurgitated part of its meal that evening, possibly due to the stress of the wash. The next day the bird was not bathed, only sprayed to recover from the wash and was given an extra meal of 40 ml fish slurry to maintain weight. Weight on day 9 was 440 grams, and feeding was changed to 50 ml of fish slurry once daily, while the percentage of salmon in the diet was increased to 50%. On day 10 the bird started daily swims in the large saltwater pool, and appeared to settle in the large pool quickly and showed a more relaxed attitude. From day 11 onwards the bird's washing and preening behaviour in the pool increased, and it was swum twice daily. However, it was still sitting too low in the water, showed poor buoyancy and a patch on the neck was still not fully waterproof. From day

14 onwards there was pressure from people involved with the Taiko team to return the bird to Chatham Island as soon as possible. While time was passing, the worries had grown about the bird fledging successfully if it was too old. Another worry was that the chick was getting very comfortable at the Wellington location of The Nest, and there was doubt whether the bird's bond with the Sweetwater site would be strong enough for it to return there in five or more years time. Also, day length is an important element in a bird's timing and navigation, and there was a difference in day length of 17 minutes between Chatham Island and Wellington, which could interfere with the bird's return to Sweetwater. After discussion with DOC and the CITT all agreed the bird would have a better chance of survival if it stayed at The Nest longer. Fledging while not waterproof would be a likely death sentence. From day 17 to 19 the bird was fed 40 ml fish slurry twice daily, after which it was reduced to 50 ml once daily till release. This feeding regime kept the bird's weight within the ideal fledging weight bracket. Waterproofing slowly improved and behaviour changed between days 19 and 24. The bird would regurgitate if fed more than 30 ml of fish slurry, and was becoming restless in the pool. The bird showed increased resentment about being handled. Considering the combination of food regurgitation, behavioural changes and significantly improved waterproofing, returning the bird to Chatham Island was considered the best option. The Taiko was returned to the Sweetwater Nature Reserve on day 24.

Back on the island

Three different options were considered about how the bird should be released to have the highest chance of successful fledging and return to Sweetwater in time.

1. To adjust the bird's internal clock to Sweetwater time, it could be kept in the burrow for at least three sunsets and three sunrises. However, the concern about this plan was that the bird would have to be handled by CITT members for daily feeds, which would be an extra stress factor and might further compromise waterproofing.
2. A hard release and forced flight from a cliff on the evening of return to ensure there was no delay in fledging and ocean foraging.
3. Placement of the bird in its burrow and leave the timing of fledging open for the bird. If it had not fledged by the next day, it could be launched into a forced flight from a cliff. The risk of this strategy was that the bird might not fledge, but move during the night and not be found again.

The release

Eventually a radio transmitter was mounted to the base of the bird's tail. The bird was placed in the burrow and monitored overnight. If it had not fledged the first night, the plan was to give it another small meal in the morning, and to release it from a cliff in the evening.

The night after its return to the island, the bird's signal was picked up from the burrow at 3 am. During a recheck at 6 am there was no signal. An extensive search in the area did not pick up the transmitter signal and the conclusion was that the bird had fledged. Whether the bird successfully returns to Sweetwater to breed will be revealed in five to nine years.

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