NESTING OF KOKAKO (Callaeas cinerea wilsoni) AT TE RAUAMOA

By HAMILTON JUNIOR NATURALISTS' CLUB
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ABSTRACT

This nesting record covers the period from nest building to hatching so is fortunately complementary to the record of hatching to fledging at Moumoukai, in the Hunua Ranges (McKenzie 1951) and to a further record there of building to hatching (St. Paul 1963), thus giving a reasonably full account of breeding.

INTRODUCTION

A summer course of the Hamilton Junior Naturalists' Club was held during December 1965 and January and February 1966 at its lodge at Te Kauri Park, near Te Rauamoa, on the Te Awamutu-Kawhia road on the south side of Pirongia Mountain. It was led by Mr K. L. Davis, assisted by Messrs F. C. Corlett, R. C. Vail and others. Much attention was given to study of the North Island Kokako *(Callaeas cinerea wilsoni)* in the bush about the lodge. Songs, calls and behaviour were carefully studied and documented and diligent search was made for nests. When at last a nest was found the leaders and members of the Club spent many whole and part days on organised watching and the taking of notes.

NESTING RECORD

20/1/66: A party proceeded to a point in the bush known as "the old pa site." Spaced out in the hope of observing nesting activity they played tape recordings of Kokako calls between 0920 and 1016 hours. Two birds were seen closely, one of them at about 2 m. Three called nearby and others distantly. The taped calls produced much response, especially to the low organ like notes.

22/1/66: The weather was changeable, with some heavy rain, but several calls were heard between 0930 and 1104.

23/1/66: At 1140 F. C. Corlett and Miss Madeline Geelan observed a Kokako gathering lichen from a fallen tree by the track leading to the pa site. It moved away as the rest of the party approached. It was seen to have darker colouring than usual and to have a yellowish bill. In the afternoon the party spread out again to watch for movement indicative of nest building. Calling was now sparse generally. A Kokako perched in a Tanekaha tree *(Phyllocladus trichomanoides)* was noted by all the party to have a red or scarlet bill. It appeared to be a sentinel, quietly keeping an eye on the party and not responding to taped calls. At 1554 another Kokako fluttered noisily from a nearby Heketara tree *(Olearia rani)* and flew

to a tree about 9 m away. It was the dark plumaged bird with a yellowish bill. At 1557 it flew off down the valley, where the red-billed one had already gone. They had not returned by 1645. Two girls climbed a tree each and were of the opinion that there was a part nest in the Heketara tree.

25/1/66: With F. C. Corlett and R. C. Vail a party went to the site at 1010. No birds were present. By use of a ladder it was found that the nest had been further built up. It was in the upper crown of the Heketara, the branches of which were laced with rata vine (*Metrosideros* sp.) and was 4.5 to 5.5 m from the ground. It consisted of small sticks woven with a lichen and stems of the epiphytic orchid *(Earina mucronata),* with, scattered in it, fresh Filmy Fern *(Hymenophyllum dilatatum).* The site was light bush on the top of a dry ridge. The vegetation on this ridge was generally dominated by Kamahi *(Weinmannia racemosa),* Tanekaha *(Phyllocladus trichomanoides)* and to a lesser extent Whauwhaupaku or " Five-finger " *(Pseudopanax arboreus).* Below the ridge a species rich forest dominated by Tawa *(Beilschmiedia tawa)* and Rimu *(Dacrydium cupressinum),* with a heavy understorey of Karapapa *(Alseuosmia macrophylla).*

26/1/66: Calls, presumably from the owners of the nest, were heard but the birds were not seen.

27/1/66: More work had been done on the nest. Both birds were seen, one of them once on the ground behind the fallen log below the track.

29/1/66: No sign of the birds during a short visit.

1/2/66: P. J. Devlin, the Club supervisor, who was now co-ordinating observation work, having invited H. R. and Mrs McKenzie to his home in Hamilton, took them on this day to the nest site to help to plan how to make the nest secure from predators, they having had experience with Kokako nests at Moumoukai, in the Hunua Ranges. PJD climbed a nearby tree, the bird having left the nest, and he saw one egg (about noon).

5/2/66: Tin sheathing was put on five slender tree trunks, including the nest tree, and vines, etc. were tied back to prevent vermin climbing up them or jumping across to the nest. The tin sheaths were about 1 m long and fitted to the trunks about 1.2 m from the ground. PJD reported now two eggs in the nest, one stone grey with fawn spots and one fawn with brown splotches.

6/2/66: Still two eggs. Both birds were studied and noted to be about 0.5 m long. The sitting bird, almost certainly the female, had a yellowish bill and seemed to be of a dark greenish colour. The male had a red or scarlet bill and was of a dark greeny-grey colour.

9/2/66: Watching was routine. The birds sang at times. When the hen was moving the eggs her tail stood straight up. This happened often throughout incubation.

11/2/66: As usual the sitting bird moved frequently. The bill of the male had now faded to reddish brown.

12/2/66: Watching was routine. The pair met in a tree and touched bills.

13/2/66: 0732. The male came onto the edge of the nest and bent forward, the female responding by bending her head backward and vibrating her feathers and body. After this ten-second caress the male dropped away down the gully. The whole process appeared to be a show of affection from each to the other. No food was passed to the female.

17/2/66: The hen bird was now very restless, moving about and fluttering her wings quite often. The male came to her and they touched bills. The bill of the male was now dark. There were still two eggs in the nest.

19/2/66: The male came in and fed the female. Both heads were visible and food could be seen passing from one bill to the other. The sitting bird was very restless and sitting up higher than before. 1156: The male fed the female as before. Next it appeared that the male was feeding something down in the nest while the female was just standing by. In the feeding process the male seemed to regurgitate food from its crop or to use some similar process. This was preceded by a " talk " between the pair when the male arrived. It was noted that the male had three different routes of approach and three others for departure. 1610 - 1620: While both birds were away T. Harrison climbed up the tree and looked into the nest. He saw two small steel-grey chicks. When he made a movement in the foliage above the nest they opened their beaks. 1623: The male flew into the nest and standing in it fed its young. 1748: The male fed the female, then the chicks. The food was definitely berries.

20/2/66: 1633 The male came onto the nearby Tanekaha tree, after bounding with long hops along the track, hopped into the nest tree and stood above the female. He then moved to the nest and fed the female, then the chicks. Much feeding like this was watched this day. The male " cluck-clucked " as he fed, for up to five minutes at one feeding. The female kept changing position in the nest and seemed to spread her feathers and tail to protect the chicks from the rain and wind. At 1722 the male, after feeding the chicks, ran up and down branches, climbed up the Tanekaha tree and caught and ate a cicada, sitting wriggling his tail. The male again approached the nest but the female was making clucking noises all the time and seemed every five minutes or so to lift her head high in order to produce more food.

21/2/66: Observation started at 0540 in intermittent heavy and light rain. Feeding of the female and chicks by the male continued but later the female also gathered food from " Five-finger " and both fed the chicks, with much chattering. Watching ceased at 0800 and

was resumed at 1622. Feeding continued and it was noticed that all movement at the time was sub-canopy. At 1726 the male, after feeding the young, dropped onto the track and bounded along it with hops of 1.2 to 1.5 m. This was a thrilling sight, really magnificent. At 1809 the first part of a scaffold was raised on the other side of the track to aid observation and photography, work on this ceasing at 1900.

23/2/66: 0715. There was no sign of the birds so the tree was climbed and the nest was found to be empty and to have a large hole in the bottom of it. There was no sign of the chicks on the ground.

DISCUSSION OF BREEDING RECORDS

The beginning of the Te Rauamoa nesting was at the time of year when the young have usually left the nest so perhaps the pair had lost an earlier clutch of eggs. This is perhaps likely since this clutch was of only two eggs, whereas three eggs is nearly always to be expected. However it could be possible that they had already raised an early brood.

The date building was started could have only been a day or so before 23 January 1966 when the nest was seen to be at a very early stage. The first of the two eggs was seen on 1 February 1966, so the building could be expected to have been accomplished in about eight or nine days, provided the bird laid as soon as the nest was finished.

For the laying period it can reasonably be assumed that the egg seen at noon on 1 February was laid that morning. As no further visit was paid until 5 February when the second egg was seen, the date of its laying cannot be determined but may be presumed to have been on 2 or 3 February, one or two days after the first.

Incubation could be expected to have started on 3 February and the two chicks were seen on 19 February so this could mean a period of 16 or 17 days.

If building was 8 or 9 days, laying 2 or 3 days and incubation 16 or 17 days the building to hatching in toto would be from 26 to 29 days.

A fairly satisfactory full record of breeding is achieved when this part record of breeding is added to the hatching to flying described in 1950 at Moumoukai in the Hunua Ranges south-east of Auckland (McKenzie 1951). In this case the chicks when found were estimated to be 2 or 3 days old and if this was so their fledging was at 27 or 28 days. The fledging was counted from the leaving of the nest tree. For about the last four days the chicks hopped about the branches but most likely roosted in the nest at night. The parents insisted almost always in making them return from the branches to the nest to be fed during this period. The definite leaving was witnessed by

J. W., R. and R. B. St. Paul. Adding this 27 or 28 days would give a full breeding time of 53 to 57 days.

An account of building to hatching at Moumoukai (St. Paul 1963) is not so clearly defined as the one at Te Rauamoa, the date of laying not being obtained, but it has definite value in regard to the building to hatching period. Nest building in an early stage was observed on 1 January 1962 and the bird was sitting on 8 January. That newly hatched chicks were taken on the night of 30 January was evident, JWStP finding the newly hatched eggshells on the ground below the nest and the bird making only a brief visit and not returning. This building to hatching period would thus be 30 days, which is very close to the estimated 26 or 29 days of the Te Rauamoa building to hatching.

PREDATION OF THE NEST

Nest damage

The loss of the chicks and the damage to the nest have not been explained. A cat goes in over the top of a nest and it is unlikely that it could have made its way upwards through the cup of green branches and the sticks of up to a quarter of an inch forming the nest base, even if it could have surmounted the tin sheathing on the trees. The nest site having been made conspicuous by the trampling of the large number of watchers, the scaffolding and the tin on the trees a hunter or vandal may have found it and maliciously pushed a stick or piece of timber through the bottom of the nest, at the same time bending a corner of tin and making scratches on it, which some have suspected a cat may have done but may have been done with a piece of timber. Pieces of the nest were lodged on the lower branches of the tree. This would hardly be the work of a cat. In any case the loss was a regrettable tragedy.

Predator Prevention

Traps were set at Te Rauamoa but no baits were taken. Domestic cats which had been abandoned would almost certainly have taken the bait, being used to the smell of the human hand. Wild-bred cats are more wary, though the first one will often take a bait and be caught but the " fear-smell " left by it will keep subsequent ones away. HRMcK (pers. comm.), with others, claims to have amply proved this. Tinning the tree where possible, putting a wide ring of strong-smelling disinfectant round it and treating traps and baits with smoke are good deterrents to vermin.

UNUSUAL BILL AND WATTLE COLOURING

Bill colouring

Records of unusual bill colours of breeding for the Kokako seem to be something new. However the evidence of it in this area is indubitable, the bill colours of this pair having been observed by many watchers. The red or scarlet colour of that of the male, first

seen on 23 January 1966, at the beginning of nest building, had faded to a reddish brown on 12 February and was the normal colour, black, on 17 February while there were still two eggs in the nest. The bill of the female, also first seen on 23 January 1966, was yellowish and this was noted up to 6 February, but on 20 February it was definitely normal. Both birds could of course have had unusually coloured bills for some time prior to 23 January. During camps in 1964 and 1965 other birds with unusually coloured bills were seen by members of the Club and by Messrs Reg. Bell and Ray Vail (pers. comm.), but the fact that this was unusual or abnormal was not at the time realised and notes were not taken. J. W. St. Paul (pers. comm.), in over seventy years of close observation of the species, has never seen such a coloured bill in any part of the Hunua Ranges, nor have the many Ornithological Society members when making numerous observations in the area, so if there have been no instances of its having been noted elsewhere it could be a local incongruity. On the other hand it may indicate the early stages of breeding, perhaps in odd cases only.

Wattle colouring

On 24 January 1969 Roger Day and ten members of the Hamilton Junior Naturalists' Club (R. Day, *in litt.*) saw two Kokako. The first was an exceptionally fine looking bird, in good physical condition. Its colour appeared to be a rich black. As well as the unusually dark colouring the most striking feature was the orange-yellowish wattles, which made a deep contrast. The second bird was called up and the difference between the two was amazing. This one was a light bluish grey all over and the wattles were a very deep blue. This was on McKenzie Track, Te Kauri Park, Te Rauamoa.

Apparently the only other report in the literature of other than blue wattles on the North Island Kokako is that of Sir Walter Buller (Buller 1888), see Turbott (1967)—

"I ought to add that, in the summer of 1867, one of these birds (Kokako) was seen by Major Mair at Te Mu, near Lake Tarawera. He followed it for some distance, in the low scrub, and got near enough to obtain a good view and to observe its bright orange wattles."

Another case is that of a Kokako skin in the Auckland War Memorial Museum. The record reads "*Callaeas cinerea wilsoni* (Bonaparte 1851) AV 6.29. Loc. Kopaki, Te Kuiti (found dead on road). Collector, Mr Hone, Kopaki, per unknown person to M. McCluskie, Waihi (Taxidermist). Date Oct. 1969. Skin. Wattles pale orange yellow." The outer primaries of this skin are in moult. This and the date may be taken to indicate that the orange yellow wattles had nothing to do with breeding.

I. G. Crook (pers. comm.), in his part in the special studies of Kokako by the Wildlife Service of the Internal Affairs Department about Rotorua and the King Country (central North Island), states

that, although he has seen no orange or yellowish wattles, some of the young Kokako he has seen have had fairly pale purplish wattles, quite distinct from orange or yellow. The Moumoukai chicks of December 1950 (McKenzie 1951) when found on 2 December at the age of 2 or 3 days, were observed by R. J. Fenton and F. Murray to have " small round wattles, pinkish lavender "; on 7 Dec., E. G. Turbott — " wattles purple, edged with bluish "; 10 Dec., EGT — " inside of mouth purplish pink "; 14 Dec., RJF — " wattles pale pinky blue, the pinkish tinge contrasting with the bright blue of the parent "; 19 Dec., A. T. Edgar — " wattles of young birds at this stage . . . . are a pale blue, rather purplish on the underside "; 21 Dec., FM — studied the mouths of the chicks carefully and found " that from the principal fuchsia red area tonings of blue and mauve showed toward the outer edges, particularly in the neighbourhood of the wattles, while deep down the throat the tone merged with yellow." Since there is only the thickness of the skin between the inner throat and the wattles it is not surprising that the purplish tinge should show through into the wattles. J. W. St. Paul (pers. comm.) states that the fledged young he has seen in the Hunua ranges had wattles of a brighter blue than those of the adults. It seems then that there is at least occasional variation of wattle colouring in individuals and perhaps in different broods.

The wattles of the Kokako are usually appressed to the chin but there can be exceptions. Alan Vail (pers. comm.) in January 1964, in Te Kauri Park, Te Rauamoa, saw and sketched an adult with wattles hanging down. On 19 February 1966, when an observer was trying to see into the nest, the female, about 3 m away, became very agitated and it was noted then that her wattles were hanging down. This was not noted of this bird at any other time. It may have been caused by agitation, exhaustion caused by breeding strain, or something more remote. The wattles hang down in death and some artists, working from skins, have been misled by this.

The Te Kauri Park chicks were destroyed before observations of their wattles were obtained. The Moumoukai chicks of 1950 (McKenzie 1951) showed hanging wattles as follows: 7 Dec., EGT — " wattles . . . . forming the angle of the gape and spreading outwards where they could be most prominent and effective as a food-guiding mechanism in feeding "; 10 Dec., EGT — " wattles cobalty, more red at angle, still flexible, but bending round distinctly into the adult position." 14 Dec., RJF — " whereas the wattles of the adults are fairly closely appressed to the throat those of the chicks stand out somewhat "; 19 Dec., ATE — " wattles lie close to the neck of the adult, like scales, ... while wattles of young birds at this stage hang down and are a pale blue." No further notes were made. It appears that this feature, like the wattle colouring, could be variable.

FEEDING

Insect feeding:

It is interesting that insect feeding was noted. On 6 February 1966 the female Kokako flew to the nearby Tanekaha tree and was seen to be feeding on something on the bark on the branches and trunk, but not going near the leaves. On 20 February the male climbed up a tree and caught and ate a cicada, wriggling his tail as he did so, as has already been mentioned. On another occasion a cicada made a distress call, apparently having been caught by a Kokako which was on the tree. Feeding insects to the chicks was not seen.

On three occasions during the 1964 to 1966 studies a Kokako was seen on the ground turning over leaves with feet and bill as if seeking food. No insect food was seen by the observers. There were no berries on the ground. Apparent feeding on the ground and in the bark of trees was noted by M'Lean (M'Lean 1912). I. G. Crook (pers. comm.) has records of Kokako feeding on the ground at Rotoehu Forest, Rotorua area. In regard to Kokako not now being seen to feed on the ground at Moumoukai J. W. St. Paul (pers. comm.) holds the theory that the ground feeders known to him in the earlier days were eliminated by vermin and that the more arboreally inclined survived.

Feeding the young:

At one time the female was making clucking noises continually and seemed every five minutes to lift her head high as if in order to regurgitate more food for the chicks. This she did while still sitting in the nest. As passerines do not usually regurgitate she may have been holding food in her throat and giving them a little as they needed it. The birds feeding the young at Moumoukai (H. R. McKenzie pers. comm.) approached with the throat distended or almost pouched with food, right up into the bill.

The study of the Kokako at Te Kauri Park, Te Rauamoa, is being continued.

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