SOME FURTHER OBSERVATIONS ON THE NESTING OF THE NORTH ISLAND FANTAIL

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SUMMARY

A record of the nesting sequence of two pairs of N.I. Fantails *(Rhipidura fuliginosa placabilis)* is given, seven nests being built by one pair, and six by the other. The effects of weather conditions on nesting, and of clutch size on the fledging period, are further discussed. The inhibiting effect of cold weather on nest-building and laying is demonstrated.

INTRODUCTION

It was not intended to make a detailed study during 1965/66 owing to projected absences during November and December; but as the season advanced, the sequence of nesting and the behaviour pattern became so interesting that more detailed field notes were kept. These records are intended to be complementary to my paper read at the Annual General Meeting of the Society in 1965 (*Notornis* 12, 127-137); and in some respects they seem to confirm my previous findings, in particular that heavy rainfall followed by mild weather induces very early nesting; that clutch size has a marked effect on the fledging period; and that there is normally a clear-cut division of labour between the sexes.

The nesting territories were described in some detail in my previous paper, and they remained substantially the same. Weather conditions in 1965 were most unusual, periods of warm weather alternating with cold and wet, and it was not until early December that settled summer conditions were experienced. The result was the abandonment of several completed nests by both pairs, behaviour which has not previously come within my experience. The sexes in each case were readily distinguishable, as the male on No. 1 territory, marked by song and behaviour prior to nesting, had a number of small dark flecks on the upper breast, whereas the female's breast was clear buff. In No. 2 territory, the central dark feathers of the female's tail carried uneven markings.

Although the 3-4-3 or 3-3-4-3 pattern for successive clutches clearly emerged from my earlier observations, there is a marked variation recorded in 1965, and the probable reason for this is discussed.

Effect of Weather Conditions on Nesting. Further evidence was obtained in August, 1965. There was a succession of wet days from 1/8/65, culminating in a fall of 5.45 inches on 14/8/65. The next day a fall of 1.37 inches was registered, after which the rain eased off, the 18th being fine and mild. Temperatures had been low early in the month, the maximum varying between 46° and 54° until the 7th. On 8/8/65, a rainless day, the maximum rose to 61°, and remained high (60° or more) until 22/8/65. On 18/8/65 I returned home after a fortnight's absence, to find that the pair on No. 1 territory had a nest almost completed. On No. 2 territory a pair was observed to be prospecting nesting sites, and on 20/8/65, a fine mild day with one

or two brief showers, they began to build. Oliver (1955) gives the nesting period as from August to January, but it now appears certain that failing the early rains and mild temperatures, the beginning of nesting is delayed for at least a month, until the second half of September. It would appear that even one cold day may inhibit the laying of a clutch for several days, and sometimes cause the abandonment of a completed nest; but once the first egg is laid, weather conditions have no effect.

Sequence of Nesting No. 1 Territory. First Nest. The birds were very active in lining a nest on 19/8/65, when 32 points of rain fell, and continued their activities on 20th and 21st, by which date the nest was completed. Building had apparently begun immediately following the heavy rain on 14/8/65. I have found in general that the building of the first nest of the season is a leisurely business, taking not less than seven days, compared with the urgent haste with which some subsequent nests are built. The material consisted of cobweb, and hair from one particular tree-fern *(Dicksonia squarrosa)*. This nest was placed at 19 ft. in a karaka tree, and was unusual in that the conventional slender horizontal fork was not used. All nests built by this pair were supported in substantial cup-shaped forks, the situations precluding the making of a tail. On 23/8/65 the weather turned cold, the maximum temperature dropping to 53°, but subsequently rising by a few degrees daily. Laying had not taken place as expected, and no activity was observed at the nest after 22/8/65.

Second Nest. On 29/8/65 I found that the first nest had been abandoned, and the birds were building some 10 ft. away, at 23 ft. in a large totara tee. The base of the nest was completed, so they had been working at the new site for at least three days. On 30th and 31st the birds completed the walls, and lined the nest the following day. No activity was noted at the site from 2/9/65 onwards.

Third Nest. On 6/9/65 the pair had almost completed another nest in a young karaka tree, at 13 ft. A first egg was laid on 9/9/65, and a clutch of four completed in the early morning of 12/9/65. This was quite a departure from the usual clutch pattern, as all first clutches in my experience have consisted of three eggs only. It would seem that the long suppression of laying since building the first nest resulted in a larger clutch. All eggs hatched during 26/9/65, and three young fledged on the afternoon of 12/10/65, the remaining nestling having died at about four days, its flattened corpse being found in the nest after fledging. The fledging period of 16 days is interesting, as in no case in my observations of 1959 and 1964 did the period exceed 15 days exactly.

Fourth Nest. On 15/10/65 both birds were observed at a new site, 9 ft. high in a karaka tree, on the westernmost boundary of the territory. This was the only nest built outside the restricted part of the territory favoured by Fantails over several seasons of observation. The female only was working on the nest, the male feeding the recently fledged young. Construction was well advanced, with the walls almost finished. The next day the weather turned very wet and very cold, and no progress was made. On 17/10/65 there was no sign of adults or young anywhere on the territory, and although the 18th was fine and mild, they did not reappear. Towards the end of the month, one

independent young bird was seen, and on 30/10/65 at 9 a.m. the family of both adults and now two independent young reappeared. The male was noted to be mildly attempting to drive the young birds away. Much allopreening was noted in the two young.

Fifth Nest. On 2/11/65 both birds were busily engaged in building at 15 feet in a totara, and despite heavy rain showers and very low temperatures, they continued working, and had finished the nest by 5 p.m. on 4/11/65. The cold weather of 2nd and 3rd had suppressed laying, so that the first egg was not laid until the morning of the 7th, a clutch of four being completed on the 10th. Both sexes brooded, for the division of labour between them only operates when there are dependent fledged young, until hatching occurred early in the morning of 24/11/65. As the time for fledging approached, the situation was watched with considerable interest, as this was to be the first record of four young fledging over three seasons of observation. They left the nest at 5 p.m. on 6/12/65, giving a nestling period of 12 days 11 hours. Broods of three nestling were found to fledge in from 14 to 16 days, and single nestlings in as short a period as 11 days 17 hours (*Notornis* 12, 135). Now the maximum brood of four is also found to have a shorter fledging period, a fact confirmed by later observations, which discounts my previous suggestion that early fledging of single nestlings might be due to their more rapid development in the nest. Sheer lack of room is the cause of the early fledging of a brood of four. For three days prior to fledging, that is, from 9 to 10 days old, there is considerable movement in the nest, some young being forced to squat on the backs of others, and later standing on the rim of the nest. At 5 a.m. on the morning after fledging, the young were in the usual tight group, 30 feet up and 15 yards from the nest, with the male feeding them, while the female was engaged in building a new nest.

Sixth Nest. The female began building early in the morning of 6/12/65, some 12 hours before fledging of the young from the last nest. The site was most unusual, being at 15 feet in a whau, where an upight branch an inch thick divided into three branches about three-fourths of an inch thick. The large leaves of the whau gave excellent cover a few inches overhead. On 8/12/65 the female was gathering lining material from the usual tree-fern, and the nest was completed by 2 p.m. on the 9th. For the remainder of the day, and all the next, she was unemployed, but took no part in feeding the four fledged young. At this stage, these spent much of their time in the usual tightly knit group, but were on occasions seen to fly at high speed through and around a tree in small circles, with much jockeying for position when they gathered together again. On 11/12/65 the first egg was laid before 7 a.m., and on the three following mornings eggs were laid by 6.45, 6.50 and 7 a.m. respectively, again making a clutch of four. It thus appears that the species has a most regular cycle of laying, a fact confirmed by subsequent observations. After laying the third egg, the female returned to the nest at 9.30 a.m. and sat for most of the day because of persistent rain.

On 20/12/65 very heavy rain occurred, over an inch falling in 45 minutes, with a total of 1.58 inches in three hours. The four fledged young from the last nest, now two weeks old, were noted with the male on territory prior to the rain; but next day only one was

seen, and there was no further sign of any of them until 24/12/65, when the male returned alone; although the day before, two immature birds, probably from this brood, were seen moving very rapidly through No. 2 territory, then unoccupied, and flying away to the south. The first egg hatched at 6 p.m. on the 28th, and at 7.30 a.m. next day the male brought food and changed over on the nest. A few previous change-overs had been observed since the discharge of the male's responsibilities to the now independent young. On 6/1/66 the young at 9 days old were very active in the nest, and both birds were feeding them continuously until 7.40 p.m., at which time, with a heavily overcast sky, it was almost dark beneath the bush canopy. Both adults then fed actively outside the canopy for 10 minutes, and at 7.55 p.m. one of them settled on the nest, for the night was cold.

On 8/1/66 during several periods of observation, the female was seldom seen to take food to the nestlings, but sat and preened a few yards from the nest, or gathered food for herself. This behaviour quite clearly indicated to me that further breeding was in prospect; and the following day she was not seen to take any food to the nest, the male during this time being extremely active. On 10/1/66 from 4.35 a.m. both birds displayed to each other, with little flight and much quiet song, for 15 minutes, until 4.50 a.m. the male took the first food to the nest. At 7 a.m. the beginning of a new nest, on which the female had apparently worked for about two hours, was noted. Some of the young were on the rim of the nest during the morning, and at noon they flew, giving a fledging period of 12 days 18 hours.

Seventh Nest. The 10th was a cold day, the noon temperature being 61° compared with 81° the previous day, and this sudden change had a marked effect on the behaviour of the female, and on the nesting sequence. The nest, of which the beginning was noted at 7 a.m., was sited at 6½ feet in a kawakawa, hard-by the last nest, and was in the only conventional site chosen by this female, i.e. on a slender horizontal fork. There was no activity at the site after 7 a.m., and an hour or so later, the female was seen to feed the yet unfledged young occasionally, taking the odd minute insect to them, compared with the large beakfuls taken by the male. On 11/1/66 there was still no building, and both birds were feeding the now fledged young, although the female did so only intermittently, perhaps once to every twenty feeds by the male. At 5.30 a.m. mating was observed, so that a further brood was assured.

On 12/1/66 the male only fed the fledged young. Early in the morning, and later, the female was seen to gather tree-fern hair, which is used only as lining material. A high westerly wind made observation difficult, and it was not until 1.30 p.m. that I discovered what she was about. She was refurbishing the recently vacated nest. I have recorded a Fantail building its nests one above the other in a series of four (*Notornis* 10, 242), but the second use of a nest is quite exceptional for the species. The last food was taken to the fledged young at 7.42 p.m.

On 13/1/66 the female was on and off the nest continually from 5 a.m. for most of he day, settling down for two minutes at 5.35 a.m. as if to lay. It was amusing to observe how every visit by the male with food for the nearby young triggered off a visit to the nest by the female, where she would give a few brief shuffles. By human

standards, she was making a pretence of being busy, while the male was really so. At this stage the fledged young were still mainly in a closely packed group, with occasional rapid circular flights, and much low twittering, especially on the approach of the male with food. The following morning the female was on the nest at an early hour, leaving it at 5.55 a.m. immediately after laying the first egg. The young were now tending to follow the male for food, but were still grouped most of the time. On 15/1/66 the female again left the nest at 5.55 a.m., having laid a second egg. Next morning she did not go to the nest until 6 a.m., and sat until 6.15 a.m. without laying. She returned at 6.20 and departed at 6.27, leaving a third egg. A very regular 24 hour rhythm of laying was observed in the previous clutch, the weather during laying being warm and settled throughout. A marked drop in temperature certainly upsets this rhythm, for the noon reading on 14/1/66 was 77.6° and on 15/1/66 it was 64.5°. The female was on and off the nest all day on the 16th, but did not brood that night, so the expectation of a fourth egg was fulfilled when she left the nest at 6.30 next morning. At 5.30 a.m. on 17/1/66 the fledged young were extremely active and at times scattered throughout the territory calling vigorously. The call is reminiscent of the Kingfisher's *(Halcyon sancta vagans)* "kek kek kek" in a minor way, and is audible for over 50 yards. At other times a ventriloquial continuous twittering note is given. It was noted that the young froze to immobility on the close approach of a Tui *(Prosthemadera novaeseelandiae).*

From this point on, a marked variation from normal in the behaviour pattern of the adult birds was noted. At 6.36 a.m. on the 17th, just after the laying of the fourth egg, the male came to the nest and sat for a few seconds, and at 7 a.m. the female settled down to brood. With the dispersal of the young through the territory their calling became much louder, and even more Kingfisher-like. During the whole afternon of the 17th the male and three young were away from the territory, returning at 6.30 p.m. with an impressive burst of activity and noise. The fourth young bird remained in the vicinity of the nest, calling persistently, and this behaviour continued until my observations ceased on 24/1/66. This resulted in the female quite frequently leaving the nest to feed it. Some of her absences were prolonged; but close brooding was probably undesirable, as the temperatures were daily well over 80°, remaining so from about 9 a.m. until the evening. Whilst the three young were still occasionally forming a loose group, most of the time they followed the male persistently and clamorously for food, behaviour quite a variation from normal; for at this age the young usually wait for the male to bring them food, which he has been permitted to gather in peace.

On 19/1/66 the male was seen to change over at the nest at 6 a.m., when the female came off to preen and feed, and changing over was noted on a number of occasions subsequently, although brooding by the male was always brief. It appeared that this behaviour by the male may have been actuated by a necessity to rest from the continuous importuning of the three young birds. For example, at 2 p.m. on 20/1/66 a noisy party of young following the male passed close by the nest, which the female immediately vacated. A minute later, the male left the young and brooded for three minutes. From this time there was no further sign of the three young on the territory.

The male was obviously away with them, but he reappeared briefly at 6.30 next morning, when he again departed apparently to rejoin the still dependent young. At 8.45 a.m. he returned and brooded briefly while the female was off feeding.

The selective advantage of the male leading the young far away from the territory, or perhaps the young leading the male, is apparent from some of the above observations. Food in the territory seemed abundant, but the continued disturbance of the female whilst brooding could be an important factor militating against successful breeding.

Early in the morning of 22/1/66 the single young remaining on the territory was noted feeding independently. Later it approached the nest giving the distinctive fledgling call, when the female flew off and mildly attempted to drive it away, then spent a brief period feeding, and giving food to the young bird. The male appeared while she was off the nest, called loudly, and she returned to the nest. He brooded briefly, and then twice attempted to mate. During the next two days the male frequently brooded, but there were long absences from the territory, when he possibly rejoined the three young, if they still survived. Observations then ceased until 18/2/66, but my wife recorded the hatching of three eggs late on 31/1/66, with a complete clutch of four the following morning. On my return on 18/2/66, the male was feeding two young, and these stayed on the territory for about a fortnight longer. The female had departed, and perhaps joined a male and immature bird remaining on No. 2 territory; but moulting had advanced so far that she was not recognisable.

Nesting Sequence No. 2 Territory. First Nest. This pair began to build on 20/8/65 at 20 feet in a karaka tree, plastering a few wisps of material on to a forked twig. There was no further activity at the site until the morning of 28/8/65, when the advent of mild temperature and some sunshine led to a day of fairly intense work. However, the site was abandoned, for the following morning the birds were found to be starting a new nest some 50 feet away.

Second Nest. This nest, begun on 29/8/65, was at 9 feet on a bare mahoe twig well under the shelter of a large nikau palm. It was noted that the second nests on both territories had a N.W. aspect, whereas the aspect of both first nests was S.E., whence all the August rain had come; but this may have been of no significance. The nest was well advanced on 3/9/65, and completed by 8 a.m. on the 5th. But the same conditions operated as those that caused the abandonment of the nest completed on No. 1 territory on 2/9/65, and this nest was also abandoned.

Third Nest. On the morning of the 7th the birds were observed to be building in a small karamu at 9 feet, and as the base of the nest was completed, they had obviously begun building immediately after abandoning the previous nest. By the morning of the 9th, the walls had been completed but were unlined, after which there was no further activity at the site. This was situated 48 yards from the second nest, and was in a part of the territory seldom favoured by nesting Fantails.

Fourth Nest. On 12/9/65 the pair was seen working on a partly finished nest at 24 feet in a totara tree, the site being quite inaccessible and observation impossible. It was on the extreme southern boundary of the territory, and 83 yards from the second nest. The female was seen leaving the nest at 7 a.m. on 18/9/65, obviously after laying. It was unfortunate that the size of the clutch could not be checked, to see whether long suppression of laying had also operated with this pair to produce a first clutch of four. Two young fledged from this nest.

Fifth Nest. Random observations only were made in No. 2 territory from this time on. On 2/11/65 a nest with four eggs was found at 6½ feet in a small matipo, the female sitting very closely, and the male feeding one surviving well-fledged young from the last nest. The female had in fact to be touched with the hand to make her vacate the nest on this and subsequent occasions. Three nestlings with primaries developing were in the nest on 22/11/65; but on the 27th the bowl of the nest was found to be almost full of pin feathers, an indication that the young had been taken by Mynas *(Acridotheres tristis).*

Sixth Nest. By 30/11/65 another nest had been built on a low branch of a karaka, at 13 feet. The first egg was laid next morning, and after the third egg on 3/12/65 the female brooded all day. However, she did not continue brooding overnight, and a clutch of four was completed next morning, brooding beginning immediately. I expected the eggs to hatch on the 19th and on visiting the nest at 5.30 a.m. found it empty, and a tail feather of the female adhering to the rim. Mynas were again the probable predators, as poison laid for rats had not been touched; so direct action has since been taken against the Mynas, reducing the number in the area from eight to two very wary birds. The female Fantail was possibly killed owing to her sitting so closely, for she was not seen again. For several days, in fact until 30/12/65, the male called a great deal, using a piercing disyllabic note, which, perhaps in imagination, had an urgent, pathetic tone about it. From 19/11/65 onwards he was always to be seen in close association with the single surviving young from the partnership.

A Note on Display. Few observations were made on display which might be described as epigamic in character. No particular display seemed to be given by either bird on those occasions when coition was observed. Little time is available to the male for nuptial display when he is feeding nestlings or fledged young, and it is only in the early morning, soon after daybreak, and again in the late evening, after the last food has been taken to the young, that much display is noted. This consists mainly of brief, rapid flights, interspersed with periods when they perch near each other, if such ceaseless movement can be described as perching. One is usually two or three feet above the other, and I have always observed the lower bird to be the male. In this situation, he sings with the well-known squeaky, disyllabic note, with at times a quivering of lowered wings. An attractive form of display is sometimes given, by either bird, when one of them, usually the male, returns from a foraging trip of longer duration than usual. The wings are fully expanded horizontally and rounded, the head lowered and the wings rapidly vibrated.

DISCUSSION

The abandonment of a series of nests at the beginning of the breeding season, and of single nests during it, has not previously been recorded for the species, and can be brought about by periods of mild weather alternating with wet and cold. Whilst bad weather causes the abandonment of both completed and unfinished nests, it does not necessarily inhibit building activity, for pairs were often found working on a new nest while the conditions causing abandonment still operated. A brood of three nestlings is recorded as taking 16 days to fledge, compared with a maximum of 15 in earlier observations; whereas broods of four took 12 days 11 hours and 12 days 18 hours respectively, due probably to lack of room in the nest; but early fledging does not prejudice the chances of survival to independence, all of a clutch of four surviving to this stage. Successful survival of single nestlings, one of which fledged in only 11 days 17 hours was recorded previously (*Notornis* 12, 135).

An exact 24 hourly cycle of laying is indicated by these observations; but if the rhythm is upset by a fall in temperature during the laying of a clutch, the cycle continues to operate, but at the later hour each day. The second use of the same nest is exceptional due probably to the almost invariable breeding of ectoparasites in the nest. All nests examined have been infested to some degree; and in the instance of second use recorded above, it is doubtful if the interval of less than four days between the fledging of one clutch and the laying of the first egg of the next was sufficiently long for the parasites to die.

One pair under observation laid four clutches of four eggs, from which probably 15 young fledged. This compares with a pair on the same territory in 1959 (*Notornis* 12, 129) which produced 16 eggs in five clutches, from which 15 young fledged, and draws attention to the extraordinary fecundity of the species under favourable conditions.

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SHORT NOTE

WELCOME SWALLOWS TRYING TO NEST IN A BOAT IN KAIPARA HARBOUR

On 29/8/66 a pair of Welcome Swallows was sent to the Auckland Museum for identification. In an accompanying letter details were given of the circumstances under which the birds were obtained.

Mr. L. W. Dudding, who sent the birds in, is the owner of a launch which he keeps moored at Port Albert, on the Oruawharo River, an arm of the Kaipara Harbour. During one of his trips out to the launch he found bird droppings in the cabin, and on a rack the beginnings of a nest. The droppings and nest were cleaned away and the porthole through which the birds had entered was closed. However, on returning to the launch a few days later more droppings were found, and also the pair of dead Welcome Swallows. They had apparently been in the cabin unknown to Mr. Dudding and had died of starvation after his departure.

Welcome Swallows have now been reported widely 'on the Kaipara' and are known to have been nesting successfully at Tapora since 1964, about 15 miles southwest of Pt. Albert.

— LOIS J. WAGENER